

# Ham Radio is Alive and Well



**Traditional Ham Radio...**  
**The stuff we did and continue**  
**to do into the 21<sup>st</sup> Century**

**Gary L. Drasch**  
**K9DJT**



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HAM RADIO IS  
ALIVE & WELL  
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**\$19.95**

# Ham Radio is Alive and Well

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By Gary L. Drasch, K9DJT

Gary L. Drasch

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Cover photo: radio station of K9DJT (G. Drasch photo)

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*“And why do we want to know this? BECAUSE IT’S THERE!”*

The above was a routine quote of one of my favorite teachers, Mr. Al Nielsen, high school physics teacher extraordinaire. I ask you to imagine him saying it very loud, his right arm rapidly swinging and hand *SLAMMING* onto a lab table, beakers and test tubes rattling, and a classroom of students laughing. May you rest in peace Mr. Nielsen—thank you for igniting my desire to learn.



# Forward

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I met Gary, K9DJT at a Ham Radio DX club meeting (where else!) in Chicago, IL and immediately found him to be engaging and fun. I soon found his in person amateur radio story unique and exciting. Gary and I share a common interest in this fascinating hobby, that of DXing and Radio Sport contesting. Ham Radio is Alive and Well is a look at where Amateur Radio is today (2017) with ties back to some personal stories that highlight the great history of a hobby that is just over 100 years old. In his book Gary shares his talent for seeking out some of the lesser understood areas of the world's great hobby – Amateur Radio. He explains many topics in detail so anyone can grasp his fun and live his passion.

Gary has been a “Ham” for most of his life, starting at a young age; this book captures the magic of his wonderment. As Gary's life progressed you can see the profound effect Ham Radio had on his career decisions – do what you love (radio) and you'll never work a day in your life! Gary ramps up his enthusiasm for radio after retiring and once again – just like when he was 13 – he is all in. This book captures almost 60 years of his passion for a hobby he loves.

Whether you are a long time Ham Radio enthusiast or just getting started, you will find this book hard to put down. I learned several things for the first time while reading Gary's work and he also reminded me of many things I have forgotten. I found my own love for Ham Radio invigorated, as I tell my friends (who are all Hams!), Amateur Radio is the first thing I think about when I wake up and it is the last thing I think about when I go to sleep. All of my career choices were tightly influenced by radio and still are today as I am currently COO of DX Engineering – the world's fastest growing Amateur Radio manufacturer and retailer.

I know you will enjoy reading Ham Radio is Alive and Well every bit as much as I did.

Tim Duffy K3LR  
West Middlesex, PA  
November 7, 2017

Foreword

The first part of the book is a historical survey of the development of the theory of the firm. It begins with the classical economists, who viewed the firm as a simple production function. It then moves to the neoclassical economists, who introduced the concept of the profit-maximizing firm. Finally, it discusses the modern theory of the firm, which emphasizes the role of the entrepreneur and the importance of the firm's internal structure.

The second part of the book is a critical analysis of the modern theory of the firm. It examines the assumptions underlying the theory and discusses the limitations of the model. It also presents alternative theories of the firm, which take into account the social and institutional context of the firm's operation.

The third part of the book is a case study of a large, successful firm. It examines the firm's internal structure, its management practices, and its relationship with the external environment. The case study is used to illustrate the concepts discussed in the previous parts of the book and to show how the firm's success can be explained by the theory of the firm.

The book concludes with a summary of the main findings and a discussion of the implications for future research. It also includes a list of references and an index.



# Acknowledgements

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If it had not been for Lyle Ten Pas, WE9R, I would have thought this hobby had long died. It was Lyle who rekindled my interest in ham radio. I am deeply indebted to Lyle, beyond that of being a good friend, for being my teacher, mentor, and Elmer. Thank you for answering so many of my questions with a question, allowing me to figure things out on my own. No matter if our conversation was ham radio, fishing, hunting, carpentry, dogs, work, or commiseration; we always managed to learn something from each other. If nothing else, the pizza and humor has always been great! Thank you Lyle.

If not for Lyle, I would not have got back into ham radio, and if not for Bill Shadid, W9MXQ, and his wife Jean, I would have never thought of writing a book. Bill started coaxing me to write ever since Jean told him she enjoyed reading my articles published in our local radio club newsletter. I have always referred to Bill as a boat-anchor historian, and want to thank him for his expertise and assistance with my “Shack Heaters to Now” chapter. He also deserves a big thank you for his general opinion of content and encouragement. Thank you for being a good friend, for the nudge to write, and for all the endless conversations and laughs.

A special thank you goes to Dr. Stan Kaplan, WB9RQR, for performing the initial edit. Your assistance and recommendations were invaluable. Another thank you goes to Nancy Stecker, KC9FZK, for her review relating to the readability of what I was trying to say. Again, I thank you both!

I want to thank Ruth Sova for answering my original publishing questions and for the encouragement to take this project on. Ruth's attitude and love towards life is infectious to say the least. My

Gary L. Drasch

gratitude also goes to Jeff Morgan for assisting me with his legal expertise in addressing my concerns.

A thank you also goes to all my friends of the First Congregational Church men's breakfast group, especially Norm Joplin, Ken Matthews Sr., Lou Probst, Don Niederfrank, Bill Greymount Sr., and Ray Schupe. Thank you for the encouragement and keeping me on track by asking, "How's the book coming?" every Thursday morning. I cannot tell you how much that helped!

Jim Albrinck, K9QLP, who I refer to as Mr. Encyclopedia, deserves a thank you for helping me with my research, as does Bill Smith, W9VA; John Becker, K9MM; Dave Patton, NN1N; Kermit Carlson, W9XA; and Ward Silver, NOAX.

A large number of pictures are the courtesy of the following people: Bill Axelrod, K3WA; Craig Thompson, K9CT; Sam Effinger, K9SD; Noll Amidich, W9RN; Gary Sutcliffe, W9XT; Don Solberg, K9AQ; Rick McGaver, NK9G; Bill Shadid, W9MXQ, Anne Dirkman, KC9YL; Bob Allphin, K4UEE; Bob Lee, W0GXA, and Bob Garwood, W0BV. I thank all of you for your help, time, and generosity.

I am very flattered to have Tim Duffy, K3LR, take time out of his busy schedule to read my manuscript and write a forward. Tim, I can't thank you enough!

Many of my anecdotes are of members of the Greater Milwaukee DX Association and the Ozaukee Radio Club. All of you have had a positive influence on me in one way or the other. I thank all of you for allowing me to share those stories within the context of this book. I would be remiss if I did not thank the club memberships listed above, and the Society of Midwest Contesters, for welcoming and accepting me into their fold. I truly value the friendship and fellowship of ALL the members! There is always something learned and laughs to be had.

Teri Grizer, K8MNJ, saved me from embarrassment with her eagle eye and editing expertness. Saying thank you is not enough to express how much I appreciate what she did for me. Never the less, I am going to say it—Thank you Teri!

Finally and most importantly, I want to thank my lovely wife Chris for tolerating my obsessive behavior relating to all my different hobbies and projects. She knows all too well how I disappear into the shack or workshop when I get my head into a project such as this book. It is unfortunate for her because I usually windup putting everything else in life on hold until I finish what I had started. Trust me; it is a trait that is a double-edged sword. I consider myself blessed; somehow or another Chris has managed to put up with it for 45 years. I thank you for your continued love, understanding, thoughtfulness and accepting me for who I am. I would not want to grow old with anyone else. Love ya!





# Introduction

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Maybe you are one of those baby boomers that obtained your ham license and got on the air regularly, and then let the hobby slide off to the side because of other priorities. Maybe you were exposed to ham radio through scouting or a Boys Club. Or maybe you had an aunt, uncle or a neighbor who was an amateur radio operator. Maybe you used the Military Auxiliary Radio System (MARS) while in the service; or had a friend in your college radio club. You always had an interest in ham radio, but not enough at the time to learn the Morse code and study for a *FCC* (Federal Communications Commission) exam. All of our life experiences are different; and having said that, please allow me to share how mine evolved with the hobby.

I was 12 years old, and most kids my age were into sports. Not me, I was into ham radio. I already had my Novice license and obtained my General class at age 13. I spent four years totally immersed in the hobby. At 16, I passed my driver's test, and as most young guys, I discovered girls. Not only did I discover girls, I had a CAR! Between going to school, working, and having a social life, my operating hours deteriorated quickly. From there life seemed to get in the way even more. Commuting to technical college, fulltime work, and later getting married did not leave loads of time for "hamming it up." I did try to setup a *shack* (radio room) in our first home but my old HQ-170C receiver and Viking Valiant transmitter were not cutting it anymore. It appeared the ham radio community had moved into *single side band* (SSB) transceivers (transmitter-receiver), which were cool, but I did not have any extra money for a new station, especially with our first baby on its way. Over time I sold the *boat-anchors* (vintage radios) and thought, "Well...someday I'll..."

I expect many licensed hams acquired their ticket at a young age, maybe not as young as me did, but in high school, college, or military. At the same rate, many people out there had an interest in obtaining a license but never followed through. Somewhere along the line, they found their dream job or wife (not necessarily in that order) and could not find the time. The family came along with all its joys and responsibilities. The job required travel and/or relocation multiple times. Then before they knew it, it was all over. The kids grew up and were having kids of their own. They are retired or about to; maybe their spouse is or isn't. The thing is, they now have time to do whatever they want. Many might travel, move to a lake home, learn how to fly, scuba dive or get back to ham radio, maybe all of them plus more. Then they start wondering, is ham radio even alive? Is anyone doing it anymore? After all, there is email, smartphones, texting, Skype, Facetime, and suchlike things being conjured up by some young engineer who does not look old enough to drive. Mention "ham radio" to strangers on the street, and if they are young they will say, "What's that?" If they are older, meaning 50 plus, they will ask, "are they still doing that?"

Having returned to this incredible hobby at the end of 2010, I have trouble believing I was one of those who asked (of a now very close friend, Lyle, WE9R), "Are they still doing that?" I used to drive about 50,000 miles a year while I was working, and I did remain active using an FM (frequency modulation) VHF-UHF (very high frequency-ultra high frequency) radio in my vehicle. One of the main reasons was Lyle. We would go fly-fishing together and kept in touch with the mobile and handheld radios while on the stream. At the time, that was what I thought was left of the hobby, FM VHF-UHF radios and repeaters (a device that re-transmits a signal). But the more I talked with Lyle, the more I discovered ham radio, as I remembered it, was very much alive and well. Lyle spoke of doing contests and *DXing* (looking for distant stations). He talked about working remote islands and countries, *QSLing* (exchange of confirming postcards) and so on. I recall saying, "Really?"

During this time, I was in the process of building a cabin in northern Wisconsin, or as Wisconsinites say, “Up North.” With it being close to finished, and being there all by myself one evening, I thought of how neat it would be to have an *HF* (high frequency) radio right then. I envisioned myself sitting at the desk, watching the haze burn off the bog in the morning, while talking with another operator across the country. After returning home, I went out and bought my first HF transceiver, a used Yaesu FT-450AT. I was immediately re-hooked! Along came a completely new learning experience. I discovered the advent of the personal computer, Internet and cellphones did not detract from the hobby but added a whole new dimension to it, making it even more fun than it had been in the past.

My hope is to reignite the passion of radio communications back into all those who thought the hobby withered away. I want to invite them to get back on the air and experience the same joy I rediscovered. Likewise, I want to encourage those who thought they should have gotten an amateur radio license back when, but didn’t. And most of all, for all those persons to have fun!

If you allowed your ticket to expire, or you do not have a license, read on. The Morse code is no longer a requirement, and there are many study guides and resources available in helping you check off, “Become a Radio Amateur” from your bucket list.

73, Gary  
K9DJT





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## Chapter 1

# They're still doing that...

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Yes, even with the dawn of the personal computer (PC), the Internet, email and texting, Skype and smartphones, ham radio is alive and well. And not just voice communications but with Morse code too, better known as CW (Continuous Wave) to radio amateurs. Radio Teletype®, abbreviated as *RTTY* and pronounced “ritty,” is much more of a common mode of operation than years past. Although SSB has predominately replaced AM (amplitude modulation) for voice communications, it is common to hear some AM-ers on the 75 and 160-meter *bands* (groups of frequencies), proudly transmitting with their vintage gear. I reflect on being a kid and drooling over the Collins S-Line gear, which I could not afford. Many kids as me, have grown up (or should I say grown old?) and today have the means of not only owning some of that classic gear, but collecting it as well. That is another niche in the hobby. The *America Radio Relay League* (ARRL), our NRA (National Rifle Association) of ham radio, and whose name came out of relaying messages from one station to another, continues to host the *NTS* (National Traffic System) to stand ready in the event of a national emergency. Hams are continuing to do all the things they did years ago, such as rag chewing, DXing, contesting, and QSLing; and having four new HF bands to do it in. Besides radio amateur satellites, hams are bouncing signals off the moon (*earth-moon-earth*, *EME*) and even off meteor-scatter. A multitude of FM and digital VHF-UHF repeaters are currently interconnected around the globe via the Internet. Today, a radio amateur can have a *QSO* (conversation) with an astronaut on the *International Space Station* (ISS). Not to mention the operators and radio clubs that setup temporary stations at schools internationally, enabling science classes to speak with the astronauts. Radio amateurs are even incorporating the Arduino and Raspberry Pi into the hobby. You could say radio

amateurs are the unfeigned leaders in technology, leading the way to communicate without the need of any commercial assistance.

So, why does anyone bother doing ham radio with the deluge of new technology flooding our lives on daily a basis? Have you ever given any thought to the game of Chess? I would have expected a game nearly 1500<sup>1</sup> years old to have vanished long before the introduction of Pac-Man, Donkey Kong, Geocaching, or Pokémon Go. In fact, people continue to play chess face-to-face on a checkered-board. Some of those chess players are playing the game with strangers and friends online using their PC's and smartphones. My friend Don has three to four chess games going on at any one time. Why does anyone persist in playing golf? (Seriously, why do they?) Of late, it has been reported that people are starting to listen to vinyl records again, saying they sound better than CD's—I never saw that one coming. The point is; the same holds true for ham radio. People are still doing it. And it is not just a bunch of old farts. There are retirees returning to the hobby but there are a few young and middle age people getting into it too. As of 2017, licensing in the United States has grown to 743,151<sup>2</sup> from 654,695<sup>(2)</sup> in 2007. Of those, approximately 50% are Technician class licensees (an entry-level license), 23% are General class, 19% are Extra class, and 7% are Advanced and Novice class (more about licensing later). I'm thinking, no big deal. Almost half are Technician class. Are these CB-ers (citizen band operators) that are generating this growth due to the elimination of the Morse code requirement? Another in-surge of Technician class radio amateurs are the "Doomsday Preppers," which have been budding here and there. The real question for me had always been, has the "traditional" HF amateur radio hobby TRULY grown? Looking back at my 1962 Callbook (a directory of radio amateurs), I found there were approximately 225,000<sup>3</sup> amateurs in the United States and about 100,000 outside of the country during that time. I could not find a breakdown of the classes of licensees during that period, but what I recall is the majority were General, and Extra class. There had been the Novice class license, which was valid for one year, and there were a few



Technician licensees, but do not believe there were many. After all, except for the Morse code test, the written exam for the Technician class and General class were identical. Because the privileges were so much greater for those holding a General class, it made sense that the logical step was to bypass the Technician class and move directly into the General class as I had. In any case, the Technician class license was originally created by the FCC to encourage experimentation in the higher radio frequency bands, i.e., at and above 145 megacycles (yes, cycles, because we were not using hertz back then) to operate all forms of radio-controlled airplanes, boats, and cars. Typically, the Generals went straight to the HF bands.

In order to determine if the number of the so-called traditional HF operators in fact grew, I decided to do a little math and combined all the traditional class licenses in use today, i.e., Novice, General, Advanced, and Extra class, and came up with 369,982. It should be obvious that this group, as the Technician class, accounts for the other 50% of the 2017 ham census. Then I subtracted the 225,000 hams of 1962, from the group of 369,982 we currently have, and came up with an additional 144,982 hams, or a growth of 64%. And that's just the traditional HF licenses, which satisfies my question; it did grow! Now, if we bring the Technician Class licenses into the mix, there is a total growth of 230% since 1962. That's a lot of people interested in ham radio!

I believe there were three-million<sup>4</sup> radio amateurs as of 2015 on an international level. I say believe because different countries use different systems to determine the number of licenses. Nevertheless, comparing that number to the 100,000 found in the 1962 DX Callbook makes it phenomenal.

The exciting thing about the large number of Technician class licensees is that they are first starting to experience a very tiny piece of this extraordinary hobby. It is an opportunity for the seasoned hams to encourage and mentor these Technicians into

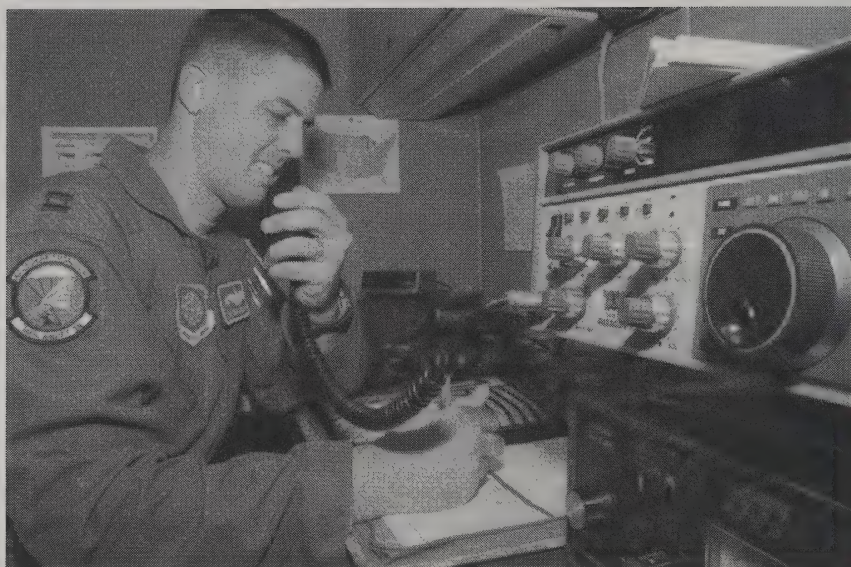
upgrading to the General and Extra class licenses. By doing so enables them to start enjoying the HF bands (or as I say, “The real ham bands”). I’m going to go as far as to say that any Technician class who does not upgrade and get into HF really hasn’t experience true ham radio yet. There are several members in my local radio club that have gone all the way up the ladder. They have studied and obtained a higher-class license by accepting help offered by other members. They have moved beyond VHF/UHF, the local repeaters, and begun talking with people around the country and world. That’s ham radio! I have a couple of friends that are taking it a step further by learning the Morse code, even though it is no longer a requirement. Why? Part of it might be nostalgic, maybe it is because CW works where voice communications are unintelligible, or maybe it is nothing more than just plain fun!

The wealth of information relating to this wondrous hobby is unbelievable. Naturally, its accessibility is all due to the PC and Internet. It ranges from sites specializing in operating aids, DXing, *DXpeditions* (hams operating from exotic locations), contesting, specialized clubs, forums on particular brand radios and amplifiers, to forums on the various brands of boat-anchors, technical sites and specific calculators, to buying and selling equipment—it is all there for the inquisitive ham.

The latest technology is allowing radio amateurs to use a PC to operate and control their transceiver. It should be of no surprise. PC’s are being interfaced with almost everything nowadays, even refrigerators! RTTY, and the new digital modes, operate by using a PC, a communications program, keyboard, and monitor. It transmits and receives its data via RF (radio frequency) between radio amateurs rather than the Internet. In the same manner, it has brought us a means of exchanging emails from a yacht, or some remote location. It does this using the same PC radio combination, but communicates with automated stations having Internet conductivity. There’s even an app for smartphones, which allows radio amateurs to communicate via the Internet to an FM repeater,

and then via the repeaters RF to other hams using a mobile or handheld radio. All this, and I failed to mention the most remarkable part of ham radio—the ability to communicate globally, point-to-point, from one radio amateur’s antenna to another. For me, that’s the awesome part of the hobby, from my antenna to an antenna somewhere else, without any assistance from a satellite, cellphone tower, or repeater. This thrilled me as a kid and I’m equally as thrilled being a senior citizen. All that, plus no one needs to pay any type of service fee! And if we boil it all down, it still remains to be the tried and true form of communications. It is of the old school, wireless without any assistance of equipment in-between. If there would ever be a catastrophic failure of the Internet, as we know it today, ham radio communications will keep on working. Although new technologies have been integrated into the hobby, they are not required to communicate to the other side of the globe. You may have already heard or seen the phrase, “When all else fails, HAM RADIO!” It is true. Give thought to the Internet with all its phenomenal communications capabilities. It is vulnerable to failure, because at the end of the day, its conductivity is dependent on the use of our antiquated telephone wires. It is no different than using the old telegraph wires draped pole-to-pole alongside the railroad tracks in the late 1800s.<sup>5</sup> I cannot imagine a disastrous failure of the Internet. My wife for one would be devastated. Cripes, she gets upset if it runs a little slow or there is a hiccup with her electronic-tablet or cellphone! Consider all the people that are so accustomed to being instantly connected to loved ones and all of a sudden, in the blink of an eye, they would no longer have that capability. This is one of the reasons radio amateurs are so important to public safety. Are you familiar with the Military Auxiliary Radio System (MARS)? MARS continues to be tested on an annual basis, where army, air force, and naval bases communicate with radio amateurs around the country using a *split* mode of operation; they transmit on their military frequency and listen to the hams on ham frequencies. In turn, it is reversed; hams transmit on their own allocated frequencies and listen to the military frequencies. The technique continues to work





*Capt. Trenton Selah, KF6BIE, 345<sup>th</sup> Airlift Squadron, Keesler Air Force Base, MS, Nov. 7, 2011. (Google for reuse photo)*

unquestionably well. Hams who participate might be surprised to receive a nice thank you letter and QSL card from the military branches *worked* (spoke with).

So here we are, new technology working with essentially old school technology. What has taken place during the past 50 years is that radio amateurs embraced the personal computer, Internet, and cellphones. They did not allow themselves to be eliminated from wireless communications, but rather integrated the new with the old. They invited new technology in and started to experiment by melding it with their radio communications equipment. Ham radio has become more interesting and exciting than ever before because of it. I was absolutely amazed when I returned to the hobby as an active participant.

As you read on, you will discover that the Internet and PC greatly enhanced the hobby rather than diminishing it. My personal computer is without question as much of my radio station as my

microphone or Morse code key. In fact, many pictures of ham stations today reveal the PC monitor and keyboard being in the center of the operating table, with the radio equipment located on either or both sides of it. It's a good thing!





## Chapter 2

# The PC and Radio

---

If you read the “Introduction” to this book, you are aware I thought traditional ham radio had died due to the advent of technology. Boy, I could not have been more wrong. As I pointed out earlier, the PC is an integral part of the ham radio station. Even the cellphone is used to assist us in operating and finding DX.

One of the apparent things in the shack compared to the 1970s and earlier, is that we are now able to connect a PC directly to later model radios via CAT<sup>6</sup> control. CAT is an acronym for *Computer Aided Transceiver* (not a PC network type cabling). This standard was originally developed by *Yaesu* to interface a PC via its serial port. Finding a male DB-9 connector, or a USB port, on the rear panel of a late model radio-transceiver is pretty much the norm nowadays. You might ask, “Why would a radio amateur want to connect a PC to his radio?” Five reasons come to mind: logging of QSOs, the storing of commonly used frequencies, using the *cluster* (explained later), operating the digital modes, and contesting. The first one, a logging program, was the main reason I originally interfaced a PC with my radio. It is true, we are no longer required to keep a logbook, but even so, it’s nice to have a record of all our QSOs. A logbook is especially useful in collecting wallpaper, i.e., awards (or as my wife says, “Another piece of paper suitable for framing”). The cool part with these logging programs are besides having software buttons that easily let us date and time-stamp the start and end of a QSO, the program automatically collects the frequency, and mode of operation, right from the radio. Looking at a clock or the frequency of the radio are no longer required. The program I use also allows me to maintain a list of *favorite* (commonly used) frequencies. These might be for a group of *nets* (a

gathering of operators) I periodically check into, or certain parts of the band I use regularly, such as the CW portion. For example, you might want to include the W1AW (the ARRL callsign) code practice frequencies on each band in the list. Once set up, all you need to do is double-click the item of interest, and the PC switches the radio to the frequency and mode you stored under that selection. It eliminates numerous button pushing and dinking around with the radio. And maybe the best part of the software is the use of the cluster and the ability to double-click on a *spot* (a cluster posting) that switches the radio to the frequency and mode the DX station is using. If you are interested in operating using the digital modes, you will need a PC connected to the radio. This is an area where the PC made a huge impact within the hobby. Besides making it easier to operate RTTY, it brought us a bunch of fresh modes to use. Lastly, you'll need a PC interfaced with the radio to do contesting.

An important feature of the logging software is the ability to track QSL cards and electronic confirmations. Each QSO has its own record in the database that contains the QSO data but furthermore, if and when a QSL card was sent or received. This also holds true for electronic verifications (we will talk about those later). The program generates a chart using all this data to show how many countries (entities) an operator worked on *phone* (voice communications), CW, and digital. It then breaks it down even further to how many on each band, AND if they are confirmed by QSL card or *verified* through the *Log Book of the World* (LoTW—an electronic confirmation). You will find even more charts, which show how you are progressing towards an award, e.g., what states you may yet need for the Worked All States (WAS) award, or what zones you might need for the Worked All Zones (WAZ) award. As we know, the PC makes it effortless to manage and track data, an attribute not available to ham operators years ago.

In addition, the logging program I use has the ability to record the audio of a QSO, in the .wav format, by clicking a software button on the PC monitor. This is accomplished by the sharing of the digital

mode audio connection from the PC to the radio. It is a nice feature if you want a recorded copy of a memorable QSO or for those involved in handling emergency *traffic* (information). Some programs provide complete control of the radio, i.e., every button, knob, or dial on the radio, is emulated through the program. Each can be adjusted through buttons and slider controls displayed on the computer screen. Although my program has this capability, I do not use it. I remain to be one of those touchy-feely characters who still prefers pushing the buttons and turning the knobs on a radio. You will find many different logging programs in the market; some are freeware and others you need to purchase. You will even find some programs specifically for contesting.

Who would have ever thought of operating a ham station from a remote location? Of course a ham did—go figure! A fellow member of the DX association I belong to, Don, K9AQ, runs his station, which is physically located in northern Wisconsin, from his home in the Milwaukee area via the Internet. The main reason he put his station at his cabin in the north woods, is that the area is extremely quiet (electrically) and he has more room for multiple antennas. He



*K9AQ remote station located in northern Wisconsin. Also used as his “cabin” shack when there. (K9AQ, D. Solberg photo)*



remotely controls the radio, amplifier, antenna switch, and rotor while monitoring power output and SWR (Standing Wave Ratio) of the station via various software applications running on PC's at both ends. Recently, he setup his cellphone with an app that allows him to access and operate his north woods station no matter where he is. This is a perfect example of melding the old with the new. Operating a remote system similar to this is a blessing for those that live in a neighborhood with covenants. What about seniors that decided to move into an assisted living type of facility? Typically, such buildings are configured in multiple levels and have no means of accommodating any type of antenna system. By having a remote station allows a ham to operate from his new living quarters as if he was at his previous home, rotor, and all. Ponder for a moment—none of this would be possible without the PC and new technology.

I am not going to delve into it here, but the Internet has been implemented on the VHF-UHF side of our hobby too. Many FM repeaters are linked together via the Internet using Voice over



*The remote control "home" shack located in the Milwaukee area. (K9AQ, D. Solberg photo)*



Internet Protocol (VoIP); programs suchlike *EchoLink* and *IRLP* permit voice communications inter-conductivity through a PC. These programs let licensed hams use their PC to access a repeater domestically, or for that matter, in any country. They could connect via voice from PC to PC if they wish, but other than accessing a repeater and having a QSO via RF, it strikes me as being quite far from conventional ham radio.

Let's step back to electronic logging for a minute. I am going to discuss *Field Day* (FD) later, but for those of you who are familiar with FD, you might look back and picture how we operated years ago. One operator was calling *CQ* (calling all stations) on the radio, another person with a large piece of paper divided in columns was checking for duplicate callsigns, and lastly another ham was writing the contact in a paper logbook. It took three people to run one station. Well, this is another example of how the PC has positively influenced the hobby. Nowadays, clubs run multiple radios during Field Day having only one operator at each. A PC, running contest software, is assigned to each radio. As the operator makes contacts, he enters the callsign of the station calling him, along with the proper *exchange* (information), into the appropriate fields of the logging program. At this point, the program checks for a possible duplicate contact, and if it is not a "dupe," the operator, after completing the QSO, presses *enter* to log it. If it were in fact a duplicate, the program would have flagged him with a notice on the entry screen. The operator would then inform the contact and wipe the fields clean. In addition, all the PC's are networked together. This allows for viewing a real-time combined score for the club, and shows who the lead operators are during the event. If I were operating a radio, I am able to see how many Qs (number of contacts) my friends are logging compared to me. It's part of the contest that adds a little more fun to the event—along with a few bragging rights afterward!

OK, if you participated in Field Day, or for that matter, in any contest, you may recall operators getting hoarse from calling *CQ*

and replying to calls. Or maybe how tired his or her fist arm (hand-arm used sending Morse code) would get. Not anymore. In this case, it is not the PC that comes to the rescue, but rather the IC chips, which were evolving at the time, i.e., those having voice storage capabilities. A friend of mine, Gary, W9XT, developed a voice/CW keyer in 1993. "The Contest Card," as he dubbed it, can be found in his article, which was published in the September 1993,<sup>7</sup> issue of *QST* (ARRL magazine). Nine years later, in 2002, he designed a standalone version that he continues to market today through his company, Unified Microsystems. It is the model VK64. Basically, it stores up to four CW, and four SSB, messages in its memory. The operator prerecords the messages using his own fist and/or voice. Now, if he or she wants to call CQ, she simply presses the appropriate message button; the transmitter is keyed and the recording is played over the air. If she wants to give an exchange, she again presses the button assigned to it. Besides being slick, it actually saves the voice and forearm! Many of the newer radios have recorders built into them or are made available as options. There is some contesting software that has recording and keyer capabilities built in too.

I cited the *Callbook* earlier. If you are already a ham, I am sure you knew what I was talking about. This invaluable  $\frac{3}{4}$ " thick magazine was the "Telephone Book" of radio amateurs. I managed to retain two copies, a 1962 and a 1976. The formal name was *The Radio Amateur Callbook Magazine*; it was started in 1920<sup>8</sup> and published quarterly in Chicago. There were two versions, the U.S.A., showing all "K" and "W" calls, and the DX edition, which was titled *The Foreign Section*, showing the callsigns in other countries. I made reference to it as a telephone book because it was laid out as such. The pages were divided into three columns, and all the callsigns were listed in alphabetical order rather than by name. By locating the callsign, I could identify the name and address of each. It was somewhat of an operating handbook too. It had various tables in it suchlike Q-signals (a brevity code), phonetic alphabet, great circle maps, countries list, prefix-by-country list, time-conversion chart,

and global standard times. And what would a telephone book be without advertisements? Indeed, it had those as well. If I had a QSO with a ham and wanted his or her address to QSL, this is where I turned to find it. Because of technology, the *Callbook* has essentially been replaced with a website called QRZ.com, <https://www.qrz.com/index.html>. Although the *Callbook* remains in business, today they only provide content in a digital format (CD-ROM).<sup>9</sup> Alas, it appears the *Callbook* has become another victim of the Internet. (One thing I never understood about the *Callbook* is that goofy Flying Horse on the cover!)

Fred Lloyd, AA7BQ, founded QRZ.COM in 1992.<sup>10</sup> Everything that could be found in the old *Callbook*, plus more, can be found on this website. Not only is it an up to date database of the FCC amateur callsigns, but each callsign record can be managed by the holder of that callsign. Licensees can write a biography, insert pictures, and comment on their achievements and interests. For example, if I were having a QSO, I can go to <https://www.qrz.com/> and in seconds, look up the other person by his or her callsign. More likely than not a wealth of information will pop up. The other operator might have pictures of his station, antennas, club memberships, boat, wood working project, cabin, fish caught, etc. Each record of the system is similar to a personal webpage. If you enjoy checking into nets and are interested in learning more about one of the other check-ins, you simply do a QRZ.com on him or her. Maybe you want to see a picture of the person, or a map of where he or she lives. Without doubt, there is a satellite view of the map, which sometimes shows the stations antennas. Maybe you are a *DX-er* (a ham who chases distant stations), and you want to find out how to QSL this individual. Does he do paper QSL's? Does he use the *Bureau (QSL routing system)*? How about LoTW or *eQSL (electronic forms of QSLs)*? Does he use a *QSL manager* (a person who receives and sends cards on his behalf)? What address should you use to send your QSL? The number of lookups on his record are also a good indicator of how active or new this ham is. Has he had a few hundred lookups or has been it thousands? Earlier, I said, "the

QRZ.com website replaced the *Callbook*, plus more!” The more is this. The tabs on the website are titled: News, Forums, Swapmeet (Items for sale) and Resources. Click the Forums tab and find Ham Radio Discussions, Technical, Logging, Contesting, RV, and Mobile discussions. Under the Resources tab, you will find Study Guides, Online License Renewals, License Wall Certificates, DX Country Atlas, Grid Mapper, and a Ham Radio Trivia Quiz. Reports of Stolen Radios, Scams, and Rip-offs can be found under the Swapmeet tab.

Years ago, every shack had an assortment of maps hanging on its walls. The favorite was the ARRL Great Circle Map (a flattened globe) of the earth. The United States was placed in the center, which allowed operators to find an azimuth heading for a *beam* antenna. Virtually every operator had a map of the United States showing all the numbered call-areas too. I have an old copy of the *Radio Amateurs World Atlas* in my shack, which was also published by the *Callbook*. I no longer use it because of the computer. The PC has become so prevalent in our homes and shacks, that we presently have an entire array of mapping software available to us via the Internet or as an installed application. Alex Shovkoplyas, VE3NEA, of Afreet Software, Inc. created a neat DX Atlas program. When using the program, I am able to display a map as rectangular, azimuthally or as a globe, showing country callsign prefixes. Measurements are easily made using the mouse and I am able to place pins into locations I have worked. There are three ways to sort a list of entities, by a prefix, by city or by island. I can find the prefix I am looking for in the list and click it; it automatically appears on the map, which eliminates hunting and searching for it. Both *grey-line* (explained later) and propagation are displayed in real-time by clicking a button. The map can be divided by CQ Zones (40 geographic areas), ITU Zones (75 geographic areas), Latitude/Longitude and Grid Squares. It is available at <http://www.dxatlas.com/DxAtlas/>. Check it out sometime!

Although our radios, be they late model or boat-anchor, may operate without a personal computer, I find it difficult not to do so.



I am at a point in operating where I even take a notebook computer with me when operating portable at my cabin—even though I have no Internet service there. The main reason for the notebook is to do all my logging and enable me to operate the digital modes. Usually people use a PC, electronic-tablet, or smartphone to log their QSOs, even if it is not interfaced with the radio, e.g., using a boat-anchor. In my case, or for any ham operating portable and not having an Internet connection, we have a choice of downloading and installing the QRZ.com database (there is a fee for it), or installing a copy of the *Callbook* database, on our PC. Either one allows us to do all our lookups as normal through our logging program.

I consider the ability to operate the radio without a PC as being the backbone of ham radio and the key to its continued utility. Ham radio continues to be our country's number one public backup communications system. Paper and pencil worked in the past and will carry on into the future. It's just not as convenient, efficient, or fun.





## Chapter 3

# DXing!

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I'm a DX-er—meaning, I'm the guy who is willing to sit for countless hours, tuning and listening for distant stations outside of the United States. Sometimes, I might spend more time watching and pouncing on a DX station spotted on the cluster. I might be checking different DX websites that provide information of when DXpeditions are planning to be *QRV* (activated). I put up with the *QRM* (interference) and bad behavior on a DX's frequency while I eagerly search through the *pileup* (explained later) trying to understand the pattern of how the DX station is listening. I might belong to a couple of regional DX clubs whose main purpose are to help fund DXpeditions. I attend seminars and conventions all in the name of learning more on how to contact that elusive station on the other side of the globe. I will most likely have a vanity call sign, 1x2, or 2x1, to help quicken an exchange. I have multiple towers, beams, and an assortment of wire antennas strung all over, including some onto the neighbor's property. Needless to say, my station consists of at least one amplifier, requiring a 240-volt outlet. More importantly, I have a transceiver that has two receivers and better yet, a panadapter to boot.

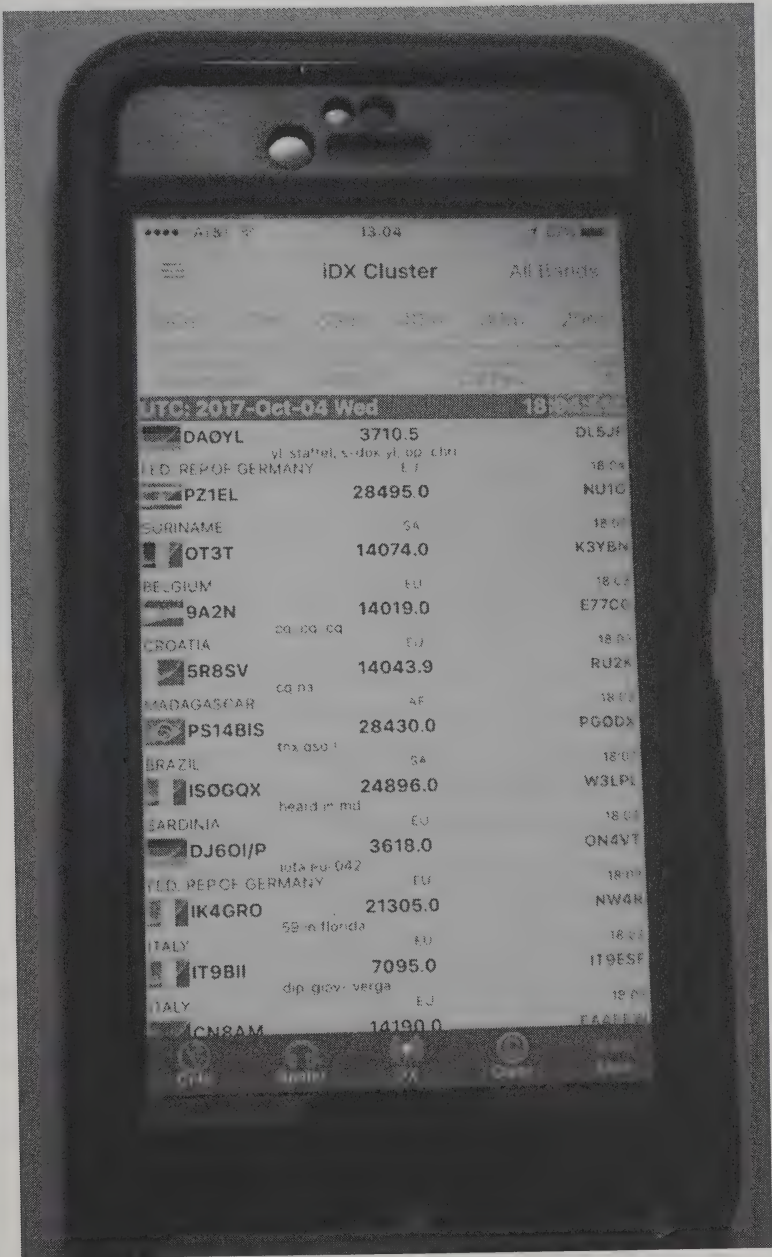
I spoke of the cluster earlier, as well as above, and described how the PC became an inherent piece of station equipment. I said that in part, because of the cluster. Some operators view the cluster as a form of cheating. It can be interpreted in many ways, but I view it as an augmentation in looking for and operating DX. The cluster is a worldwide network of computer servers, where radio amateurs can post information, using their own computers as terminals, about DX stations, or for that matter, any station that they worked or heard. It is not a general bulletin board to post a bunch of junk on, but

rather a place for information that is of value to other hams who might be interested in working that same station or particular location. A posting usually includes info such as the frequency the DX station is transmitting on, the mode they are using, if they are operating split, and how far up or down in frequency they are listening. The *spotter* is a radio amateur placing the information on the cluster with his callsign noted as such. A spotter could be located anywhere on the planet, and that is why we want to know his callsign; we then have an idea of where he is located. The DX callsign, frequency, and mode are typically, but not necessarily, taken directly off the spotters radio and posted through his logging software. The spotters comment though, e.g., up 2, or PSK31 (phase shift keying), or simplex, is typed in by the spotter and usually has a character limit. We can see postings from spotters within our logging software or a separate telnet window.

I have found cluster apps available for smartphones that'll alert me if a particular DX station I have been hunting for has been spotted. One of my favorites is "iDX" developed by J. Marcio, PY4OG. Another good one is *DxSpot* written by Bob Chandler, WB2ETR. I have often allowed myself to be awakened in the middle of the night to work DX. Even if the alert feature of the app isn't used, it is still great for checking the general band conditions anytime and anywhere. You never know, it might be worth leaving my spouse at the store while I go back home to work some DX!

Any radio amateur may own a cluster-node and make it available to other radio amateurs via the Internet. The differences between various nodes are usually the way the owner of the node decides who is allowed to use it, and how they are allowed to sort it. VE7CC has one of the best tools for sorting I have ever found. Check it out at <http://www.bcdxc.org/ve7cc/>.

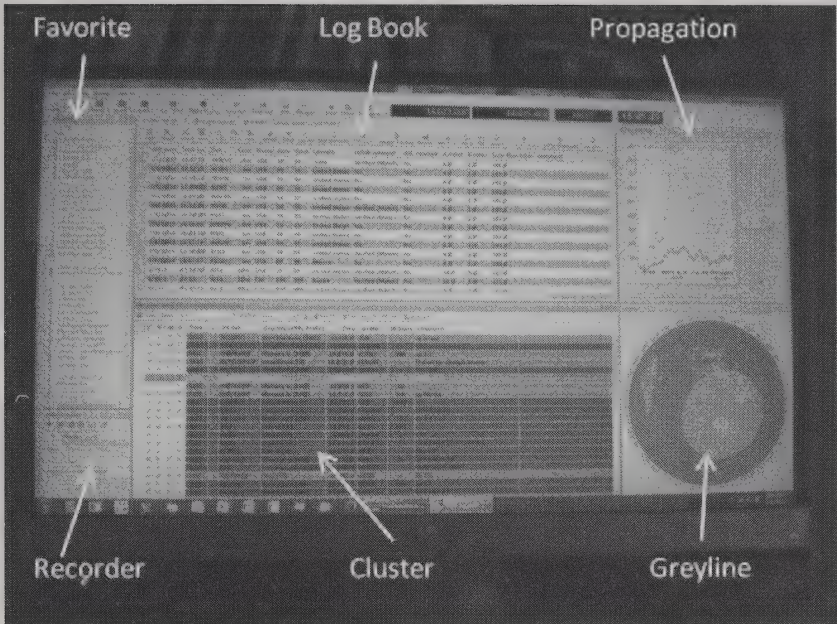
Let us assume I am viewing the cluster within my logging software, and I see a spot for a DX station in a country I have not worked yet.



*iDX App showing Cluster spots in left column, their frequency in the center and the spotter callsign at the right. It is much better in color! (G. Drasch photo)*

How do I know I have not worked that country (entity) yet? For myself, having worked 304 thus far, I guarantee it is not by memory. The logging software does it for me. It is constantly checking my logbook against the cluster spots, and flags me with an "X" and/or a red highlight on that particular spot. I get excited when I see those! Now I need to switch my radio to the mode and frequency spotted. The frequency is the frequency I will be listening to, plus I need to operate split, because the spot said the DX was listening UP. For that reason, I need to adjust my transmitter, VFO B, to a higher frequency than he is transmitting on. It could take a moment or two, but this is the neat thing. I take my mouse and double-click the flagged spot on the cluster window and voila, the radio changes bands and switches to the correct frequency, changes mode, and splits the A-B VFO's. Wow! All that control simply by clicking the mouse! All I need to do is adjust my "B" VFO to where he is listening and turn the beam; the software even makes that painless by providing me with a heading to do so. Cooler yet, there is some software that will even turn the beam for me; obviously, this requires an appropriate rotor control box. If my radio changed bands, wouldn't I need to switch antennas? Guess what, that can be automated as well. Gary, W9XT, designed a *band-decoder* in 2001 that can be interfaced with a variety of late model radios. It can trigger an electronic antenna (coax) switch to the appropriate cable based on the band selected on the radio. But wait, what about the linear amplifier? Don't I need to switch bands, and tune that too? Not to worry. Solid-state amplifiers, big ones, which switch bands with the transceiver and tune themselves via memory, are a reality. *Amazzzzing!* (Another Al Nielsen quote.) So there we have it. Complete station automation. With a click of the mouse, we can change the band, frequency, mode of the transceiver, amplifier band, change antennas, and the direction of the antenna. This capability is not only highly desired by DX-ers, but testers as well. Even so, we still need to speak into the mic or pound some brass (Morse code)! Or if we are testing, maybe not. More on that later.





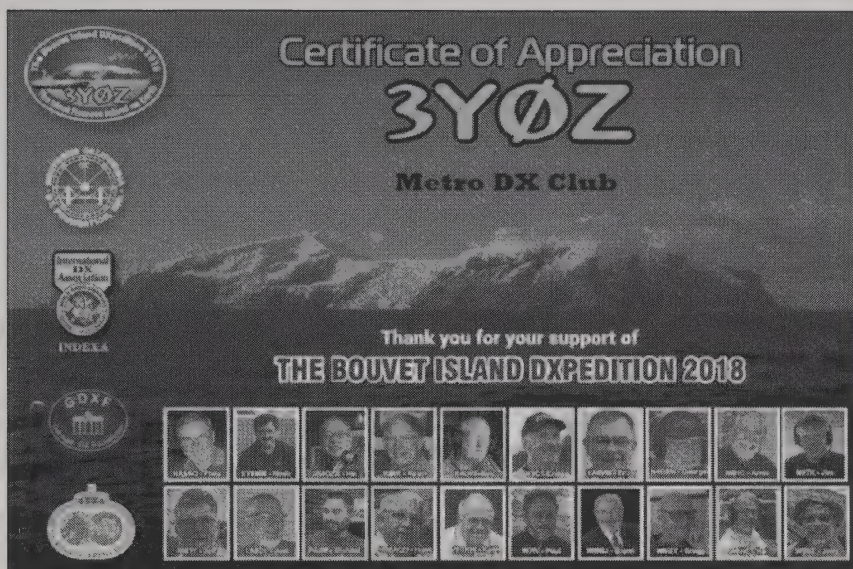
*HRD Logging program. B/W does not do it justice. (G. Drasch photo)*

The ability to identify DX, or any station for that matter, does not end with the cluster. How about an automated type of cluster? Absolutely, a *CW skimmer*, more commonly referred to as just a skimmer. A skimmer that can decode RTTY is known as a *RTTY skimmer*. A multichannel decoding program that decodes signals across a receiver's bandpass is the brains of these skimmers. It is specifically looking for CQing, along with the stations callsign that is calling the CQ. It uses a waterfall display, showing multiple traces that are then labeled with the stations callsigns. I view a skimmer as a robotic spotter. In contrast to a cluster, no person is involved in hearing or working a station, and then spotting it. The station is electronically detected and displayed robotically. After I used the cluster for awhile, I discovered that not all the information is accurate. The case being, humans are entering the data, and that is why I have a tendency to rely on the accuracy of a skimmer a little bit more. As the cluster, any ham may own a skimmer, but instead of simply placing a PC on the Internet running a node program, he

will require a dedicated receiver, antenna, and computer with appropriate software.

When I returned to the hobby in 2010, I had no clue of what a DXpedition was. I did not know of or recollect any DXpeditions in the 1960s. Being a kid, maybe I was already overwhelmed with the hobby and did not want to admit it. Or the fact we were near the bottom of a solar cycle the year I obtained my license, and I hadn't worked much DX. When I learned of DXpeditions, I immediately wished I were younger, had more money, and no heart condition. I made an attempt to explain a DXpedition to Jeff, a non-ham friend of mine, at lunch one afternoon. I vividly remember how humored he was by it all. Let me explain. I began telling Jeff the sole purpose of a DXpedition is to provide radio amateurs, everywhere in the world, an opportunity to work a rare location where other radio amateurs do not normally reside. Humankind recognizes 196 countries, but not all of them have resident ham operators. Having said that, the ARRL recognizes 339 entities, i.e., countries and islands combined, that an operator could potentially work. So, how can I have a QSO with an entity if there is no ham there? Ah, that is where the DXpedition enters the scene. A DXpedition is comprised of radio amateurs, usually 10-20, that may or may not already be friends, or maybe they are acquaintances through various DX clubs. They each put in \$15-20 thousand dollars of their own money, and then plan and propose a trip known as a DXpedition. The destination will be some rare place ham radio operators have not been able to contact. Why is that? The most likely reason is that the only inhabitants are penguins, rare birds, flora, bugs, or animals near extinction. It might be an island with an abandon WWII airstrip or with a few people on it. To make this happen, the DXpedition charters their own transportation via air and water, even chartering helicopters and specialized ships when necessary. They bring their own shelter, radio equipment, towers, antennas, generators, fuel, food rations, and drinking water when necessary. Sometimes, the governing body of the island will require them to transport all their garbage and waste back out. The cost of these DXpeditions





*Certificate sent to supporters of the Bouvet DXpedition. (YB2TJV, D. Hidayat photo)*

can be astronomical; much more than the 10-20 hams can come up with on their own. Depending on the destination, the costs may go anywhere between a half a million, to three-quarter of million dollars. This is where the DX clubs and operators pitch in dollars to help fund this craziness. The Northern California DX Foundation, Metro DX Club of Illinois, Greater Milwaukee DX Association, along with many many others from around the world are examples of such. Another source of revenue for a DXpedition comes from QSL card requests by those that made on-the-air contact with the DXpedition. The money collected from QSLs is relatively small but never the less helps offset some of the costs incurred. Radio, antenna, and cable manufactures might make monetary donations in addition to providing equipment. This is the kicker, and the reason Jeff was laughing. The duration of the stay is relatively short, lasting a week or two, then packing up and returning home. Jeff says to me, "but they leave the operation, the radios, and antennas for others to use after they are gone, right?" I replied no! Jeff, said, "You mean it's just for making contacts; nothing else, they pack up

and go home?" My reply was, "yup!" He was laughing so hard, I thought he was going to choke on his Belly Buster Burrito! Is it really any worse than a group of rock climbers paying outlandish amounts of money to climb Mount Everest? Although there have been a few deaths on DXpeditions, I deem the odds of survival to be much better. Plus all the radio amateurs on this sphere benefit from the trip. That is money well spent!

During the late 1920s and 1930s,<sup>11</sup> there were expeditions, but they were primarily geographical and exploratory in nature, for example, *Admiral Byrd's* Antarctic expeditions. One or two radio amateurs traveled with an expedition to make long distance communications available. In their spare time, these same radio amateurs communicated with other hams that wanted to work a new country. The voyage of the schooner *Kaimiloa* is another example. The owners traveled the South Pacific in 1924, and while they enjoyed the islands, the radio operator, a ham, had QSOs with other hams stateside and eventually mailed QSL cards confirming the contact. Geographical expeditions were resumed after World War II in where radio amateurs participated. The *Gatti-Hallicrafters Expedition* to Africa in 1948, with Bob Leo, W6PBV, is an example. Although it was an expedition, it was not in fact a DXpedition for the specific purpose of activating an entity for radio amateurs. It was more of a Hallicrafters promotion touting their equipment after the war. As far as I can tell, the first DXpedition as we know it today, was done in 1948 by Robert W. Denniston, W0DX (SK), utilizing the call sign of VP7NG. It was to the Bahamas and was called "*Gon-Waki*." Denniston, who was an ARRL past president, is the person who created the concept of traveling to some remote location for the sole purpose of activating an entity. His callsign of W0DX is now that of the *Caribbean Contesting Consortium*, a memorial station in his honor. Later, there were adventures' such as Danny Weil, VP2VB (SK). Danny began traveling in 1955, often solo, to multiple locations in his sailboat named the *YASME*<sup>12</sup> (Yasme means, "To make tranquil" in Japanese). He hauled his radio gear along and provided many DX-ers a new entity. Later, in 1959, *The Yasme*



*Foundation* was created and led by Dick Spenceley, KV4AA (SK). The purpose of the foundation was to raise money to support additional DXpeditions by Danny until his DXpedition retirement in 1963. Lloyd Colvin, W6KG (SK), and Iris Colvin, W6QL (SK), decided to pick up the *Yasme* DXpeditions, and continued well into the 1990s. Currently, we have websites dedicated to DXpeditions such as <http://dx-world.net/>, and <https://dxnews.com/>. And what would DXing be without a DXpedition calendar? You bet! You can find it at <http://www.ng3k.com/Misc/adxo.html>.

The ARRL introduced the DXCC (DX Century Club) program in 1937.<sup>13</sup> DXCC is an award available to those that have worked and confirmed 100 countries using different modes and/or bands (because islands count, it should be 100 entities rather than countries). Additionally, the award can be earned on each band and mode, or a combination thereof. The program was discontinued during WWII while the ham bands were dark, but started up again after the war ended and continues today. DXing started easy for me and then became harder as I accumulated increasingly more entities. I managed to obtain my DXCC using mixed modes, i.e., a combination of phone, CW, and digital in about a year. Over the following five years, I finally achieved DXCC using each single mode.

So, what is the big deal in chasing DX, especially after one receives the DXCC award(s)? Is that not the pinnacle? We know our station is working, why keep chasing? Each of us have a different reason, but for me it all started with a banquet dinner I now attend annually. It was at the W9DXCC convention (an annual DX convention sponsored by the Northern Illinois DX Association) in the Chicago area. After dinner, the host invited the attendees that were hams to stand up. He then said, "All of you that have worked more than 100 entities, remain standing." The people that had not, needed to sit down. It was "The Last Man Standing" of DX! He kept going by increments of 25 until he hit 300, and then to 301, 302, and 303 until he reached 339. (339 are the maximum presently available.) I only had 126 entities under my belt when attending my first dinner.

It was humbling to sit down so soon, but it was likewise a revelation to see how few remained standing as the process proceeded. It was down to two men that radiated the feeling of standing forever, Bob Kelley, W0BW (SK); and Joe Schroeder, Jr., W9JUV (SK), with W9JUV<sup>14</sup> winning. It was awesome! Both of these gentlemen were much older than me. Later, another ham said to me, “that’s the secret to winning, you simply need to live long enough.” There are other DX associations around the country that hold similar events every year. Try to attend at least one sometime. You will truly enjoy it!

The ARRL “Honor Roll”<sup>15</sup> is a prestigious award, which is dependent on the total number of entities worked and confirmed. Radio amateurs who confirm working an entity count that places themselves within the top 10 of the total number of DXCC entities qualifies and may make application. As an example: An operator needs to confirm 330 entities out of 339 available. (The number of entities available is determined by the ARRL, and periodically changes.) I remember being at a point when I was working towards



*Anne, KC9YL (formerly KC9UHH), is an avid DX-er and contester which is proof that ham radio isn't only for men. (J. Dirkman photo)*

my first DXCC award that I questioned if it was even possible. At present, I am working towards the “Honor Roll,” which to me is the true pinnacle of DXing, a challenge I hope to realize during my lifetime. But wait, there’s more! One day Lyle, WE9R, told me about a DXpedition that was active and said, “I need them on 80 and 160-meters.” My reply was, “but you already worked them.” He explained that he was filling band-slots. “Band-slots?” I said. He replied, “Yes, that is when you try to work every entity on each band.” I’m thinking, now that is something to do! (Don’t forget—I am retired.) The ARRL refers to this slot thing as the “DXCC Challenge Award.”<sup>16</sup> The person confirming they worked at least 1000 band-slots, then 1500, 2000, 2500, and ultimately 3000, takes the award home. The score is determined by adding the number of entities he or she has on each of the HF bands plus 6-meters. For example, if I had 223 confirmed on 20-meters, 183 on 17m, 234 on 15m, and 186 on 10m, I would have a score of 826 band-slots, or, as the ARRL refers to them, “*band points*.” The person, who hits the 3000 mark, when divided by 10 bands, has worked and confirmed 300 entities per band!

I view DXing as a game or sport. Not necessarily a game of chance, but more of a mental and endurance game. A certain amount of technical competency, electronic, and electrical construction skills are involved. I draw an analogy to that of auto racing; an engine is built, a car is assembled, a driver needs to learn how to drive it, and then the team hopes he doesn’t get hit or run off the track. My DXing sport has similar variables, e.g., the station I created and assembled, the antenna system I designed and erected, my operating technique and skill, and the luck of good propagation. Some people have the bucks to put large massive stations together. However, the operator, utilizing what he bought, must still develop the skill and technique to make that DX contact he’s been chasing. I was surprised when I visited the shack of a fellow member of the Greater Milwaukee DX Association, K9ORN. Brian is presently at 313 entities worked, and accomplished that using primarily vintage gear, which he purchased as a young man. His antenna system is



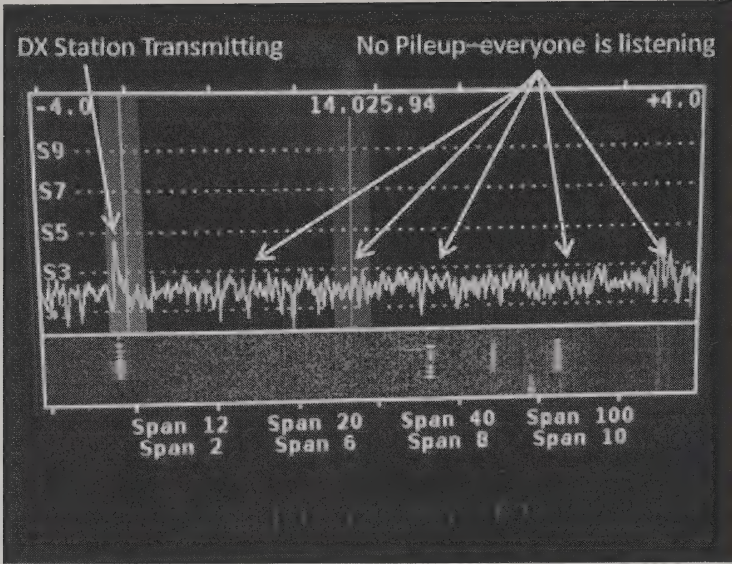
nothing fancy, it is a single Stepper IR vertical. This is a case where Brian knows how to use his gear AND how to work the pileups. Some of the best DX-ers I have met use rather old equipment, and the reason they are successful is that they know how to get all they can out of their gear. They furthermore know how to be found in the pileup.

I previously referred to the pileup a couple of times. What is it and how does one work through it? As I explained earlier, nearly all DX stations work split, meaning they transmit on one frequency and then listen on a different frequency above, or sometimes below. The key to knowing if the DX is running split or not is to listen to them. If I hear the DX give their call and say, “up,” I know they are working split. Simple! The reason he is split is that there are so many stations calling him—almost continually—that none of the stations would hear the DX reply, if they were all calling him on his frequency. All those stations calling, hundreds at times, are referred to as the *pileup*. If the DX station is popular but not necessarily rare, he might listen on only one frequency above his, and say, “Up 5,” meaning he is listening 5-kHz up. If he is super rare, he will be tuning back and forth between 5 and 10-kHz up from his transmit frequency. A good DX operator says, “Up 5 to 10.” I have a hard time to keep from laughing when listening to a pileup. I just find it hilarious at times.

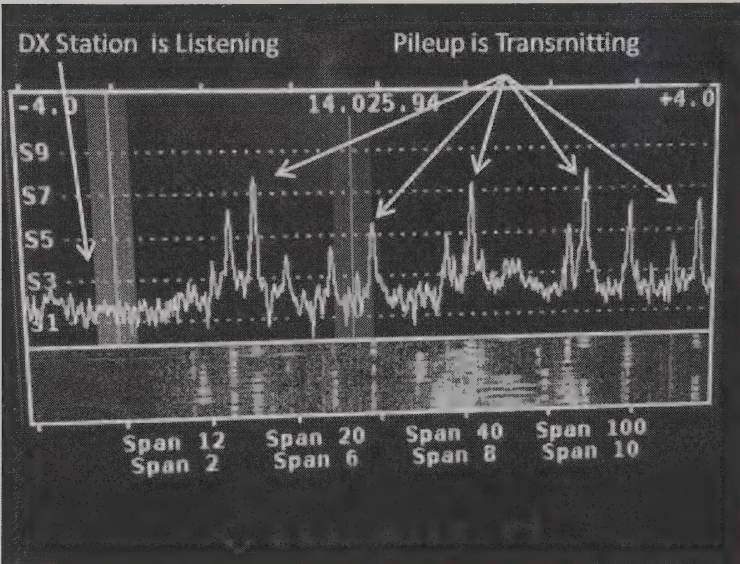
I have a friend who I invited to attend a DX club meeting one night. He replied, “You know, I’m not that interested in DXing.” I call and call and they never hear me.” What he was really saying is he does not know how to be heard in the pileup, even though he owns a radio with dual receivers. You might ask, “what does a radio with dual receivers have to do with breaking through the pileup?” Everything! The lion's share of transceivers have dual VFOs (variable frequency oscillators), A and B, meaning we may listen to one frequency on VFO A and transmit on a different frequency with VFO B, or the reverse. What we cannot do, is listen to both A and B simultaneously. To work DX that is split, we are going to want a



radio that we can listen to both the A and B VFOs at the same time, meaning two receivers within the same transceiver. This type of transceiver that has two receivers, not only has the ability to transmit on VFO B, but it can additionally listen to that frequency. Do you see where this is going? If we were to park our transmitter, VFO B, on a frequency in the pileup and wait for the DX station to find us, we will be waiting for a long time. Or maybe, as with my friend, we may never be called at all. However, if we could hear which station the DX station worked last, we would be close to where he is listening. Once we have that radio with dual receivers, we continue listening to the DX station on his frequency, VFO A, and tune our VFO B into the pileup and listen for the last station the DX worked. The DX station might remain listening there for a minute or two and work a couple of stations on that frequency. Alternatively, he might move up or down a kHz or two at a time and pick up another caller. If that is the case, we tune the second receiver, VFO B, (keep in mind, our transmitter is tracking our second receiver) either up or down and we try to get barely ahead of where he last worked a station. Immediately, we have an exceptional chance of being his next contact. I find this to be the real fun in DXing, the mental game of what the DX station is doing. Is he moving up or down, does he come all the way back down to the bottom after he gets to the top of the pileup and start over again moving up, or does he start moving back down after he gets to the top? Does he jump from the top to the bottom and never listen in the middle? Maybe he randomly moves about in the pileup, up one, down two, down another one, up four and back down three and etc. That is the worst scenario—it is impossible to determine a pattern because he does not have one. You have probably been thinking; how does a DX-er decipher, or distinguish, the signals between the DX station and the station he contacted a moment ago? The standard way is to use cans, otherwise known as headphones. If the radio has dual receivers, it gives us the ability to split the VFOs on the headphones. There might be a couple of different configurations available depending on the brand of radio.



*Panadapter display showing split mode. DX station is to left on green cursor. No Pileup to the right. (G. Drasch photo)*



*Panadapter display; This time the DX station is listening. Red cursor is in the clear between stations in the Pileup to the right. (G. Drasch photo)*

The common way is to listen to the DX station on VFO A with the left ear, and the pileup, VFO B, on the right ear. That might sound crazy but it works well once you have done it for awhile. My hearing in my left ear is impaired compared to my right, and all of a sudden, I realized I was starting to have trouble hearing the DX on VFO A. As most dual receive radios, I was able to adjust the volume of the two VFOs separately on my Elecraft K3.<sup>17</sup> Although I had been doing that for some time, I continued to have trouble hearing the DX. Then one day while going through the manual I uncovered a setup where the operator can listen to VFO A with both ears, and configure it so VFO B is only heard on the right ear. Perfect! By the same token, it can be setup in the reverse with VFO A solely on the left and VFO B on both. If we are not wearing headphones, most dual receiver radios allow us to use a pair of speakers in the same manner.

Now that we know how to find where the DX is listening, it is time to give him a shout. But before we do, can we hear him? The DX that is. We know where he is listening, but is the DX readable? We do not want to call him if we cannot hear him well enough to know if he is replying to us or a different operator. In nearly all cases, the DX station has the ability to hear better than domestic stations because they do not have the noise as we do stateside. It is possible for them to hear us and we are not able to hear them. If we call and are unable to hear them, we are wasting their time. Okay, assuming we have a solid copy on them, we will move forward. While tuning in the pileup, we likely found operators giving their callsign two or three times, right in a row, almost connected together. They are still calling when the DX station is already replying to a different caller. How is the DX station going to hear them if he is transmitting and calling a different station? What the DX station is listening for is a single call, not multiple calls from a station. What we need to do is find where we want to transmit and give him our FULL call once, and then listen. (He is NOT interested solely in the suffix of a callsign—it slows things down—he wants the full call.) If he remains quiet, we call him again, once! If he comes back with a different callsign than ours, we do not transmit unless we want to antagonize



him. I hear this happening all the time. If he is asking for W6XYZ and we are N3DAH, why would we call him? He is not replying to us, so we wait until he does. The DX asks for one specific callsign and three or four others all reply—not cool. Wait for the DX to finish the contact. When we hear a “thank you” come from the station worked, we listen to ensure the DX is not transmitting, and then we call him again, only once. We need to be in the habit of calling only ONCE, then listen, call once, and then listen and so on. This is likely happening as we are following other callers with VFO B. I have frequently gone into huge pileups and made the QSO in one or two calls. It is not going to happen all the time but our chances of making a contact is much better than not. At the point, the DX station calls us, we reply by saying, “59 thank you.” In CW, it is 5NN TU, and the TU is sent so fast that it sounds like an “X.” (The “N” in 5NN, rather than 599, is referred to *cut numbers*. I will talk about them later.) Consider this for a moment, the DX is trying to accommodate literally thousands of other hams, the likes of you and me, in a finite amount of time. Consequently, they want each contact to consume the least amount of time as possible. Of late, it is becoming common to reply only with 5NN and skipping the TU simply to shorten things up and use less time. Time is that important!

Prior to 1961, DXpeditions would send and receive on the same frequency, and if they were operating CW, they would send 599 and therefore receive a report of 599 too. The concept of operating split and using 5NN was the brainchild of Don Miller, W9WNV.<sup>18</sup> Don had once said, “If I ever have an opportunity to be on a DXpedition, I’m going to do things differently.” His chance arose while serving as a physician in the military during the Korean War. He was licensed as HL9KH while in South Korea and came up with the idea of shortening the time spent on each QSO, hence the current standard of operating DX.

Operators that work the DXpedition more than once on the same band, in the same mode, are doing nothing more than wasting the



DXpeditions time. They need to stop that. We do not do it unless we know for sure that we are not in the DXpeditions log with our first contact. I have met a few individuals that work them twice to ensure they got them; a terrible misuse of the DXpeditions time and the potential of robbing a fellow amateur of working *an all time new one* (ATNO). Here is a tip. To ensure we worked him on a particular band, we work him again but we use a different mode on the same band. If I worked him using CW, I then pursue him using SSB or maybe RTTY. That way, I can reasonably count on having them on that band. Many DXpeditions upload (via satellite) their logbooks to Club Log or their own website where we can check and see if we are in fact in their log. If we do not find ourselves in it, we need to try them again. Who knows, we may have worked *Slim*! (More on Slim later.)

What about a *panadapter* or a *bandscope*? Why use one of those? (The term panadapter and bandscope are used interchangeability to describe a radio spectrum scope.) Marcel Wallace<sup>19</sup> invented a panoramic spectrum display in the 1930s that provided radio operators a graphical display of signal amplitudes verses frequency. Today, the device visually shows signals (stations) within the RF spectrum. For example, we may look at a bandwidth as little as 2-kHz wide and up to 200-kHz wide with an Elecraft P3<sup>20</sup> panadapter. This gives an operator the ability to see each signal and its amplitude (strength) within the bandwidth chosen. We are able to see a complete pileup. As a result, when the DX station replies to a specific callsign, we will see the calling station pop up on the display when he replies with his 59 thank you, or 5NN TU. We can see where the DX has been listening and what direction he is moving. What hinders this method is when people that are NOT being called also reply. Instead of one signal popping up as it should, we might see three or four. Watch for signals that pop up in the exact same place each time the DX calls for a reply. They are NOT the ones being called. Those being called are in a slightly different place each time. Those ARE the ones we want to follow with our VFO B. Panadapters have become so much of the norm



*My shack. The monitor on the right is the log entry window. (G. Drasch photo)*

that they may have lost some of their advantage. That is partly due to more radios having them built in. Let us not forget SDRs (Software Defined Radios) whose receiver display platform is based on a panadapter, and displays multiple slices of the RF spectrum on a PC monitor at one time. Some hams have created their own panadapters by connecting the output of the 1<sup>st</sup> I.F. of their radio through an SDR dongle, software, and a PC. Check it out on YouTube at <https://www.youtube.com/watch?v=wqcGACGPtRM>. It works!

Certain operators might be afraid to try CW for DXing because the DX stations are maybe transmitting at 24 *words-per-minute* (wpm) or faster. Do not let that scare you. You do not need to copy any text at that speed other than your own callsign. After all, you are not going to have a full-blown QSO—it is a 5NN TU and you are done. I am good at about 17-wpm in a standard QSO, but when working a DX station, I can pick my callsign out at about 30-wpm.

Go practice. Look for the free CW practice programs on the Internet. The other thing you need to practice is sending your callsign and 5NN TU, at about 22 to 24-wpm. I try to adjust my transmitting speed to that of the DXs speed. The only caveat is that even if he is at 30-wpm, I remain at 24-wpm.

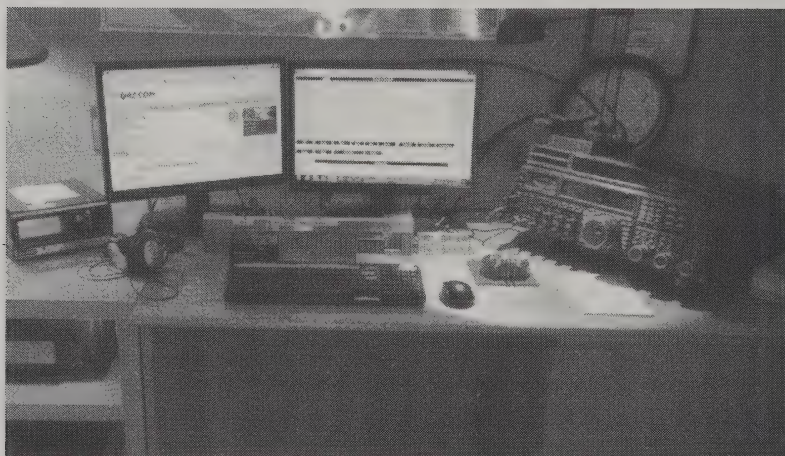
A little more frequency spectrum is adding to the DX experience nowadays, i.e., we have some additional bands to use. The WARC bands, 12, 17 and 30-meters were made available to us after a 1979 conference in Geneva, Switzerland known as the World Administrative Radio Conference<sup>21</sup> (WARC). The bands were available to use in the early 1980s. Referring to the ARRL band plan,<sup>22</sup> you will notice they all have a narrow bandwidth that is 100-kHz or less. Because of this, it was agreed not to permit contesting on them. This created a nice place for non-contesting amateurs to meet and operate without the interference of testers. It was further decided that phone communications would not be permitted, and no more than 200 watts P.E.P. (peak envelope power) allowed, on 30-meters in the United States. This created a terrific place for the CW and digital/data boys to operate.

The 60-meter band was introduced in 2002,<sup>23</sup> but only a few countries were allowed to use it. It is not considered a WARC band because it had not been part of the conference. Only Denmark, Finland, Iceland, Ireland, the United States, and United Kingdom had the privilege of operating on 60-meters. Later, in 2015, the ITU World Radiocommunication Conference approved a worldwide frequency allocation of 5351.5 – 5366.5 kHz to be used in the ham bands. Referring to the ARRL band plan, you will see the band is broken into five channels, and the power is limited to 100 watts P.E.P. Moreover, because the band is shared, the United States requires us to use *USB* (upper-sideband) for phone communications to accommodate intercommunications with non-amateur services, if necessary.



What exactly is a vanity callsign and how do we get one? In 1978,<sup>24</sup> the FCC decided to grant, or let's say create, vanity callsigns. They are referred to as 1x2, 2x1, or 2x2 calls, e.g., K2HB, NM4P, and KA1AH respectfully. Both DX-ers and Contesters alike, often have a vanity call in order to shorten things up; to make it easier to work DX contacts, or faster to make contest contacts. To obtain a vanity callsign, we need to have a callsign to trade-in. A Technician class, when originally licensed, is issued a 2x3 callsign by the FCC, such as KC9XXX. He or she are unable to choose that callsign. Once they have it, they may trade it in for a 1x3 vanity callsign. The same holds true for a General class licensee. Advanced class licensees may apply for a 2x2 callsign and Extra class holders may apply for 1x2, 2x1, or 2x2. RadioQTH.net located at <http://www.radioqth.net/> is a callsign search tool that lists various callsigns and availability. We can apply for the callsign we are interested in by using the FCC Universal Licensing System (ULS). As of September 3, 2015, the FCC did away with the regulatory fee.

The sole reason I have not applied for a vanity call is because "DJT" has been with me since I was 12 years old. First as KN9DJT and then K9DJT. It's just a nostalgic thing...



*The CW Contesting and DX station of W0GXA (W0GXA, R.C. Lee photo)*



## Chapter 4

# Propagation

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When I was 13 years old, in my mind, the bands were either open or not. I did not study propagation nor thought about it a whole lot. I was utterly unaware of the *solar cycle* at the time. It was probably a good thing too, because cycle 19 was on the way to bottoming out. Looking back into my tattered light blue 1962 ARRL Handbook,<sup>25</sup> I found there were only two paragraphs referring to cyclic variations, and I don't remember reading them. By the condition of the book though, I must have come across them at some point. Or maybe because I didn't have any control over the band conditions, I felt it wasn't worth the bother. The only excuse I can come up with is that I hadn't met Mr. Nielsen yet. Propagation is truly a study within itself. We have so many more tools available to help us today than when I got started. You may want to do some general searching, or you can go to the ARRL website at <http://www.arrl.org/propagation-of-RF-signals>. It contains an entire list of valuable articles. Besides articles and tutorials, there are propagation charts and propagation predications. And no doubt, many books are available on the subject.

Years ago, the only way we knew if a band was open, meaning there was propagation, was to listen and tune around. Plenty of times, I did not bother to call CQ because I didn't hear anybody else. Thinking back, that was not too smart because if all the amateurs that were listening thought the same as me, we would never know if the band was open or not. Then again, being only 13 years old, I wasn't thinking that far.

In order to get a better handle on propagation, rather than listening for other hams, The Northern California DX Foundation (NCDXF),

came up with an idea, and created the first beacon network at and around the frequency of 14.100-MHz. The year was 1979.<sup>26</sup> It was decided the network would be international in nature, having locations around the globe, with each site transmitting a signal at a regular interval. Each site location could be identified by its callsign in Morse code. In this way, the beacon network allowed radio amateurs, no matter where they lived, to assess the current condition of the ionosphere and the propagation of radio signals to any location on earth. The first beacon was designed and built by Jim Ouimet, K6OJO (SK). He did this because of a suggestion by O. G. "Mike" Villard, Jr., W6QYT (SK), who was a professor of Electrical Engineering at Stanford University during the time. Mike was the same person who introduced SSB on the amateur bands in the late 1940s. The FCC licensed the first beacon as WB6ZNL/B (the /B indicating a beacon). The network consisted of nine frequency-sharing CW beacons, and had been in operation for almost 15 years, when the *International Amateur Radio Union* (IARU) proposed a larger network. They were so impressed with the system that they proposed a network of beacons that would operate 24 hours a day. In addition, they wanted the network to operate on five bands with the transmissions shortened from a one-minute message every 10 minutes, to one every 10 seconds. This enabled listeners to monitor all the beacons in three minutes. The transmission of the beacon callsign is sent at 22-wpm, and then followed by four one-second dashes. The callsign and the first dash are sent at 100 watts. The power then decreases to 10 watts, one watt, and then 100 milliwatts for the remaining dashes. After each 10-second transmission, the beacon steps to the next higher frequency band. The locations are as follows: New York City, Canada, California, Hawaii, New Zealand, Australia, Japan, Russia, Hong Kong, Sri Lanka, South Africa, Kenya, Israel, Finland, Madeira, Argentina, Peru, and Venezuela. The frequencies of each location and more information are available at <http://www.ncdxf.org/beacon/index.html>. The NCDXF/IARU Beacon Project was later expanded to 18 beacons in 1995, and has been operating ever since because of sufficient worldwide funding. My logging software has a

favorite frequencies list that allows me to select any of the beacon frequencies I programmed with the click of the mouse. When I want to see what type of propagation is going on, I simply double-click a beacon in the list and the program takes the radio there through the CAT connection.

Another new propagation network emerged not too long ago. It is called the *Reverse Beacon Network*<sup>27</sup> (RBN). This network, instead of transmitting a signal on a regular basis, listens to the bands using a CW skimmer and reports what stations it hears. The RBN includes hundreds of monitoring stations worldwide. Unlike the NCDXF/IARU project, the RBN is strictly volunteers that are willing to setup and maintain a monitoring station at their own expense. The resulting information is displayed on a website having the appearance of a telnet cluster. It shows what station is heard by what skimmer, what frequency they are transmitting on, a signal to noise ratio level in decibels, and at how many wpm they were sending. Try it at <http://www.reversebeacon.net/main.php> and call CQ using CW. You'll be able to see where you are being heard on the map.

Ok, when should you operate? My normal response is, "anytime you want!" It's like fishing—anytime is a good time to go fishing! But as fishermen know, there is a difference between "fishing" and "catching." The same holds true when trying to work DX. Anytime is a good time to DX, but if you are interested in catching more DX, you might want to focus during the grey-line. That is the period of time just prior to the sun rising, and just prior to it going down. The grey-line is a ring around the Earth separating daylight and darkness. The D-layer of the atmosphere, which absorbs HF signals, has not built up yet on the sunrise side before it disappears on the sunset side of the grey-line. As a result, DX communication is exceedingly good throughout this window. Many map programs show the grey-line live. In fact, my logging program provides such a map, which I keep displayed while operating. There is a good *QST* article, July 2010,<sup>28</sup> by Steve Sant Andrea, AG1YK, titled, "When Should I Operate?" explaining this phenomenon. (Old *QST* articles

are available for download to members of the ARRL as a .pdf on the ARRL website at <http://www.arrl.org/arrl-periodicals-archive-search>).

I confessed earlier that I was unaware of the solar cycle, (the 11-year change in the sun's activity) when I first got started. When the levels of solar radiation and expulsion of solar materials interact with the earth's magnetic field, radio propagation is drastically affected. The number of sunspots and flares all has a positive effect. The more sunspots during a year, the better it is. The recording of sunspot activity first began in 1755.<sup>29</sup> That means the current solar cycle, number 24, is the 24<sup>th</sup> cycle since that time. I was fortunate to have re-entered this hobby during its upswing. It began January 4, 2008, but first started generating reasonable activity in 2010. Unfortunately, it is now beginning its down swing. I thought the band conditions were fantastic, but recently learned cycle-24 is likely going down in history as a cycle with the lowest activity ever. So, what do we do during the bottom of a cycle? We focus on the bands that work, the low bands, 30, 40, 60, 80, and 160-meters. I spent the majority of my time on the higher bands in the past because they were so good. That's what needed to be done. In the present circumstances, I'm focusing and spending my time, on 30, 40, 80, and 160-meters. It does not mean we give up on the higher bands, it means we monitor the beacons and hope for some openings. We further make use of the *weak signal* (WSJT) digital modes, i.e., JT65, JT9, and FT8. They all do a good job.

In the end, it comes down to another variable radio amateurs need to deal with when chasing DX. If it was easy, all hams would be on the "DXCC Honor Roll" and the fun would be out of it. As far as propagation, we can study it, track it, plot it, and predict it, but we cannot control it. Because of that, we get on the air and operate as we always do. Hey, maybe I wasn't all that wrong at 13 years old!



## Chapter 5

# Contesting

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Radio contesting, sometimes referred to as *radiosport*, received its start back in the 1920s.<sup>30</sup> This happened to be when radio amateurs in the United States and Europe were attempting to communicate across the Atlantic Ocean. At the time, more radio amateurs were trying and becoming successful in communicating over large distances. This was the advent of DXing! After communications were established across the pond in 1923, the testing and attempting of transatlantic communications continued and soon became an annual event. The ARRL was the organization that was promoting and publicizing these tests. Later, in 1927, the ARRL created a new format for the annual event by asking stations to try to make as many contacts as they could with operators in other countries. This milestone soon became known as *The 1928*<sup>31</sup> *International Relay Party* and thus the very first ham radio contest. It was such a success that the ARRL began sponsoring it annually through 1935. In 1936, a name change was in store, and what emerged was the *ARRL International DX Contest*. It continues today, retaining the same name. Contesting continues to be part of the hobby where radio amateurs around the globe try to make as many contacts as they can with one another while following certain parameters. For example, besides exchanging each other's callsign, they might be required to exchange a signal report, a name, a state, or maybe a serial number, such as, "You are contact number 412." Contestants also have the possibility of increasing their score by obtaining multipliers. A multiplier might be working different counties, states, entities, or maybe callsign prefixes. As with any type of competition, there is a specific amount of time allotted to each.

Contests are sponsored by a variety of organizations ranging from the ARRL, IARU, *CQ Magazine*, and radio clubs in the United States and the world. The awards presented by the sponsors in the various categories range from certificates to plaques.

There's a love hate relationship among radio amateurs when it comes to contesting. There are hams that love it but there are those that absolutely hate it. The rationale being, testers occasionally interfere with a regular scheduled QSO or informal net. They don't do it intentionally. It's just something that happens because of the pure volume of testers on the air at the same time. Many contests now have suggested frequencies to help relieve such conflict. The other thing available to the *haters* are the WARC bands. It was decided not to allow contesting on the WARC bands because of the limited bandwidth of each band, but additionally as a frequency spectrum for those that are not interested in contesting. This provides the non-tester a place to operate without the possibility of contest QRM.

If you look at a contest calendar such as the one WA7BNM publishes at <http://www.hornucopia.com/contestcal/contestcal.html>, you will likely find a contest occurring every weekend. There is a contest for you no matter what duration of time or mode interests you. Long ones go for 48 hours, to short ones lasting 12 hours, and even mini ones lasting only 30 minutes. There is CW, SSB, digital and mixed modes. For reasons unknown, I did not get into contesting until recently. Maybe it was due to a conversation I had with a friend of mine. He said, "Unlike DXing, where you work a finite set of entities, with contesting, you start over each time. You begin at zero and build from there." As there are DX clubs, there are Contesting clubs. There are also contesting stations. Large ones, specifically designed for "Multi-Multi" contesting, having three to four operating positions all going at the same time. Or how about stations having the capacity for a separate operator on each band? Yup—all running simultaneously. And undoubtedly, there's a magazine, the *National Contesting Journal* (an ARRL publication). I

joined the Society of Midwest Contesters club in 2016 because several members of my DX club belonged as well. DXing and contesting go hand-in-hand. It is about building a station, developing a high performance antenna system, and honing the skills to compete among friends and other clubs. Plus it is a means of working countless DX and/or states in a weekend. In the last 160-meter CW contest, I managed to work all states except for four. Furthermore, contesting sharpens our operating skills. My CW copy speed has gone up, and it is easier for me to copy callsigns when using phone. Once you have contested for awhile, you will find that a rhythm develops while making all those valuable Qs. It's fun!

There was a gentleman (I am unable to remember his name) who was the keynote speaker at one the of W9DXCC banquet dinners I attended. What he said surprised me until I thought about it. He said, "It isn't a question of our nations communication systems

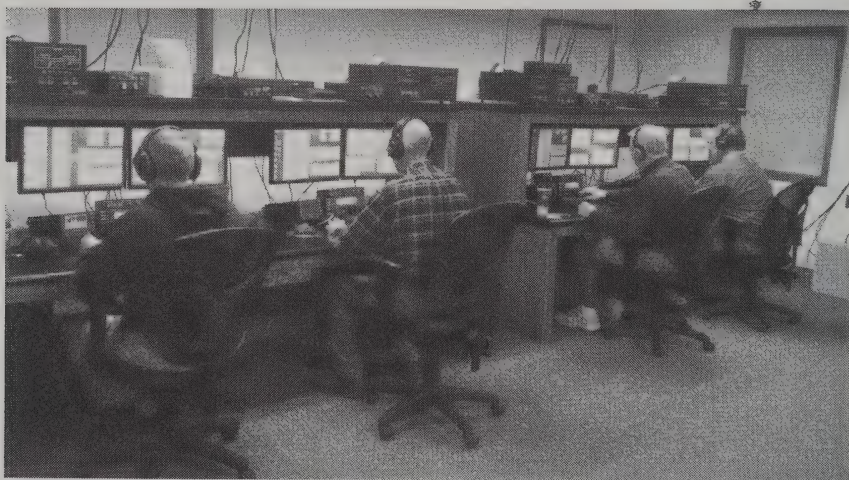


*One of four operating positions at the K9CT contesting station. (K9CT, C. Thompson photo)*



failing someday. It is a question of when.” He went on to say, “There are all types of radio amateur emergency nets in existence, but I believe the *contesters* will be handling the majority of emergency traffic, simply because of the out-and-out volume of it.” The more I thought about it, the more I started to think he was right. It is fairly evident during Field Day where there is a honest cross-section of operators. It’s easy to differentiate the operators that are contesters compared to those that are not. Contesters have developed a technique to communicate with hundreds, if not thousands, of other contesters accurately and quickly.

A contester does all he can to maximize his number of contacts. Seconds count! Abbreviations such as “CQ test,” instead of “CQ contest,” are used frequently when operating. If the name of the contest has an abbreviation that is shorter than “test,” he uses that. Another example of a true contester is he finds a frequency and parks there while he calls CQ (this is referred to as *running*). He will S&P (search and pounce —tuning and looking for others calling CQ) only after he feels nothing left to be had on his



*K9CT contest station during the CQ World Wide competition. (K9CT, C. Thompson photo)*



frequency. He wears headphones and wants to log his own contacts on the PC, rather than having a friend at the keyboard; it is more accurate and less time consuming. His communication with the other operator is short and to the point. When the exchange is made of the signal report and classification, he does not bother saying, "please copy" each time he gives his. *Please copy* is a total waste of airtime. He may or may not even say thank you at the end of the contact because of the amount of time it takes. The goal is to collect each other's information and move on to the next as quickly as possible. That is how to rack up a lot of QSOs and points! A CW operator does the same thing as a SSB operator, but he takes it a step further. He uses what is referred to as *cut numbers*. When sending the exchange of the signal report and classification, instead of sending 599, he sends 5NN, the same as working DX. If you are a non-code person, "9" is sent as DAH DAH DAH DAH DIT. Compare that to the much shorter "N" which is DAH DIT. When it comes to the serial number, the true CW contester has two more cut numbers he uses. They are for numeral 1 and 0. He sends an "A" for 1, and for numeral 0, he sends a "T." Again, in code, the difference being 1 is DIT DAH DAH DAH DAH, and an "A" is DIT DAH. The 0 in code is DAH DAH DAH DAH DAH, and a "T" is simply a DAH. The origin of sending a T for 0 began with the American Morse code,<sup>32</sup> otherwise known as the Railroad Morse during the mid-1840s, when code was still being sent over wire. The practice was to send an extra-long dash for a 0, but because of electronic keyers, ham operators began sending a single dash. The real purpose of shortening things up is all about time. I know, it is barely a second or two difference per QSO, but all those seconds add up.

The code speed during a contest varies. If I am doing a search and pounce, I try to match the CQers speed when calling them. When using a contest logging program, I am not using my key or paddles to transmit. I select the speed I want to send at within the logging program, and when I press the appropriate function key, it sends the code for me. As far as copying him, I probably heard his exchange once or twice from his previous contact and already

entered the data. S&P takes more time to make contacts because I am tuning around between Qs. Because of that, my copy speed is not as critical as if I were calling CQ. If I am in the running mode, calling CQ, I normally do it at 20-wpm. I hear others calling CQ at 24-wpm and faster because they are usually able to copy faster than that. At 20-wpm, I have callers at 17 to 18-wpm and maybe up to 22-wpm, but in general contesters try to adjust their speed to mine.

I admitted I am good for a conversation at about 17-wpm, but I can copy callsigns at a much faster speed. The reason is that I practice copying *nothing but* callsigns. Who would have thought of specific programs and smartphone apps to assist us in doing that? I have an app on my iPhone called the *Koch Trainer*. The Koch Trainer is based on the *Koch method*<sup>33</sup> of teaching Morse code. It was developed by a psychologist by the name of Ludwig Koch in the 1930s. It provides choices of listening to words, callsigns, QSOs, and random letters all at various speeds. I likewise use two other programs on my PC. The first one simulates a contest that includes interference and static while it sends callsigns. It is called *Morse Runner*<sup>34</sup> and was created by Alex Shovkoplyas, VE3NEA. I need to select a code speed that I normally use during a contest in the setup. The program then simulates callers at varied speeds near that. I type in the callsigns as I copy them, and get graded on my accuracy at the end of the exercise. The other one is *RUFZ*,<sup>35</sup> which was created by Mathias Kolpe, DL4MM, and Alessandro Vitiello, IV3XYM. The RUFZ program is also used for callsign copy training. With this program, I first need to select a starting copy speed within its setup. Then, once I start an exercise, as I copy and type in the callsign, the program decides if my entry is correct or not. If in fact it was correct, the next callsign comes a little faster. If I was correct again, the next callsign is sent even faster. The speed keeps increasing until I make a mistake. When that happens, it starts to slow down. Make another error and it slows down again until I get one correct. At that point, the speed starts increasing again. I regularly use the Koch trainer on my phone because it is always with me. I use the two trainers on the PC for

awhile before an up and coming contest. It's a good way to sharpen our skills!

If you want to get started in contesting, it is imperative to interface your radio with a PC. You then need to select a contest logging program. There are many: a few are N1MM+, N3FJP, and WriteLog. I happen to use N1MM+, which can be found at <https://n1mm.hamdocs.com/tiki-index.php>. This program is free, it works, has all the current contests imbedded, and is updated on a regular basis. I dare say, it has pretty much become the standard among testers. Once you have your radio and software interfaced, it is time to select a contest to enter. Contests require that you select a classification, which fits your station configuration. You will need to understand various *contest abbreviations*<sup>36</sup> in order to do so. Here are a few of them:

**MO**-Multi-Operator

**MS**-Multi-Operator, Single Transmitter

**MM**-Multi-Operator, Multi-Transmitter

**M2**-Multi-Operator, Two Transmitters

**SO**-Single Operator

**SOAB**-Single Operator, All-Band

**SOSB**-Single Operator, Single-Band

The power category you want to run needs to be selected as well, e.g., **HP**-High Power, more than 150 watts; **LP**-Low Power, 150 Watts or less; **QRP**-Very Low Power, below 5 watts average output power. Another part of the classification setup is selecting either *Assisted* or *Non-assisted*. If you want to use the cluster or skimmer when operating in the contest, you need to select **Assisted**. Obviously, **Non-assisted** is for those NOT using any type of aide. The ARRL has a nice contest glossary at <http://www.arrl.org/contest-glossary>, where you will find a surplus of the above. You may have noticed the classifications for the serious testers that permit the use of two operators and two transmitters or more. These are used by the contest stations I mentioned earlier. What I didn't include in

the list was the acronym **SO2R**. It stands for *Single Operator Two Radios*. There are hams in my contest club that are very good at this. For my part, I remain baffled in how they manage to do it. How this plays out is that a *single operator* operates two separate stations, on two different bands, using separate antennas, concurrently. He *runs*, calling CQ and answering callers on one band; on the other band, he *searches and pounces* looking for people calling CQ to contact. He differentiates the two stations the same as a DX-er would, listening to one receiver in the left ear, and the other in the right ear. By entering the contest as a single operator, he needs to make certain he transmits with only one of the two transmitters at any given time. There is even special hardware marketed to the contesteer to ensure it. (The main reason for operating on two different bands is primarily to prevent damage to the receiver of the opposite station.)

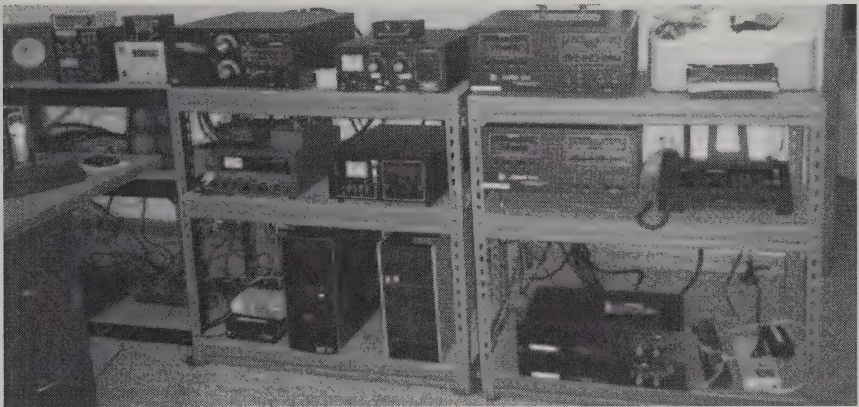
The Internet managed to bring some niceties to the contesting game too. These days, contest logs are sent to the sponsor via email or uploaded through a website in a standardized format called *Cabrillo*. Also, there is no more waiting for my results to be published and wondering how I fared compared to other operators. I can go to a website at <http://www.3830scores.com/index.php> and compare my unconfirmed score with others. All I need to do is find the contest I participated in on the website, fill in a form with my summary data of the contest, e.g., the number and type of contacts on each band, the number of multipliers, my power, and the classification. Without question, this is all available from my contest logging program. All the scores are claimed and unconfirmed, but nonetheless it is still cool to see my score among the others. If I'm in competition with a couple of friends, or between clubs, and have an Internet connection, I am able to share my log in real-time to <http://cqcontest.net/view/readscore.php> and compare scores live. Imagine how much fun that is!

Once you get into contesting, you will become more serious each time you participate. For example, I frequently practice my CW



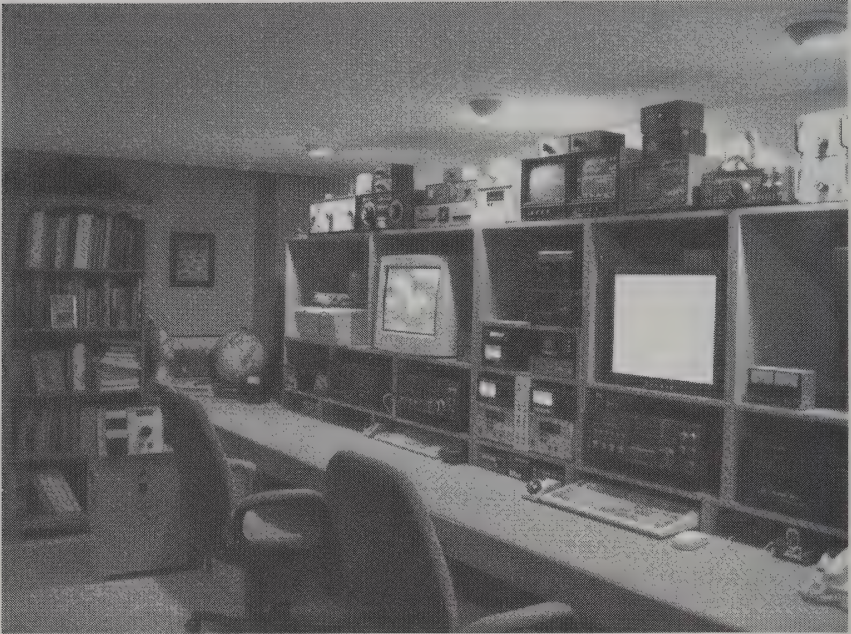


*SO2R operating position of K3WA using the very latest technology.  
(K3WA, W. Axelrod photo)*



*And here is the station muscle! (K3WA, W. Axelrod photo)*

copying skills prior to a contest, and set up my chosen contest within my logging program, a few days earlier just to make sure the station plays as it should. No one wants to be fooling around trying to make things work at the time the contest starts. It is no different than preparing for a fishing trip; I want my rod and reel to be ready when the fish start biting.



*The shack of K9SD. (K9SD, S. Effinger photo)*

I planned to do the *Wisconsin QSO Party* (there is QSO party contest for almost every state) from my cabin in Forest County, WI, only to have it to turn into a complete bust. That happened even though I checked my stuff out prior to leaving on the three-hour road trip. I setup my notebook PC and radio combination at home, checking the headphones, voice-keyer, and footswitch, leaving nothing to chance. At any rate, that is what I thought. A long story short, my Carolina-Windom antenna at the cabin would not tune. Up till now, I had been happy to see it up in the trees when I arrived, and never gave any thought to the transmission line being troublesome. Water made its way into a coax connector splice, froze and broke it apart. I cannot tell you how heartbroken I was. And it was only a stupid seven-hour contest! A friend of mine had a mishap that created a similar result. He was ratcheting up his crank-up tower 30-minutes prior to the start of a World Wide DX Contest, when the cable broke, allowing the complete tower to collapse within itself. The main thing is he did not get hurt, but his beams and pride were. The booms of both beams, at the mast, were bent downward at

about a 35-degree angle due to the sudden stop. More than a few days passed before he came out of his funk. I forgot to mention, he takes contesting very seriously!

Be prepared—contestng and DXing are equally addictive!





## Chapter 6

# QSLing

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We shouldn't be startled that an electronic means of confirming QSOs exists for all those awards we enjoy chasing. Although so much more practical and affordable, it is different from receiving that special QSL card in the mail. I look back to the 1960s and can see myself handwriting QSLs, placing the QSO information AND the operators address on the same card. I then placed a three-cent stamp on it and dropped it in the mailbox. It resembled a post card—having a great time, wish you were here—remember those? Well, if you enjoyed receiving those jewels in the mail you are still in luck. My friend Rudy, NF9V, likes collecting QSLs. Rudy has some special cards displayed in his shack, but in addition, he has QSL sized plastic file cabinets literally filled with cards, all in alphabetical order. The exchanging of QSL cards is very much alive, except it costs a good deal more. In the past, if I sent a QSL to a contact in the United States, he or she happily reciprocated with one of theirs. Hams that do that are now far and few in-between. The new norm is to send our QSL in an envelope, along with a self-addressed stamped envelope (SASE). At the time of this writing, the cost is 49 cents to send ours there, plus 49 cents for the return SASE, plus the cost of two envelopes. Ah, and not to forget the cost of the QSL card. I recently had 1000 custom cards printed for \$80. Hence, to receive that precious card, I am going to spend a total of \$1.06. And that is domestically. Now consider obtaining a card from a station in a different country. I again send my card along with a self-addressed envelope (SAE), but instead of placing a stamp on it, I am going to enclose either two or three “green stamps,” i.e., dollar bills. Those two to three dollars are used by the recipient to mail his card to me. In some cases, the DX station might even request more money. The postage of \$1.10 is needed to send all the above to

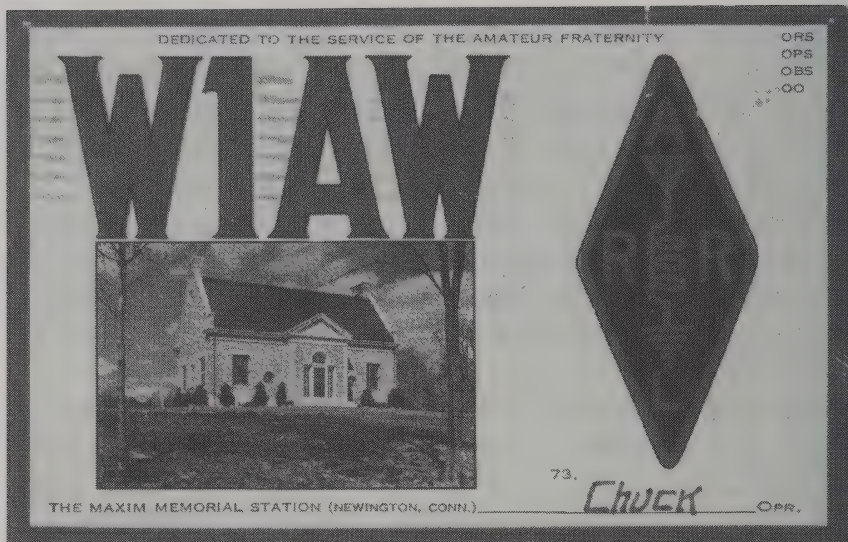
him. So, let me add this up. The cost of my card is eight-cents, the dollars sent to him for postage is \$3.00 and the postage to mail all this is \$1.10. That comes to \$4.18 to receive that single QSL card. There are times when I sure hope I am in his log and he doesn't use the money for beer. HiHi (laughing in Morse code). My original comment when hearing this from my friend Lyle, WE9R, was, "that is outrageous!" Lyle replied, "Hey, It's cheaper than smoking!" Neither one of us has ever smoked, but he was right. I have often rationalized expenses relating to my hobbies by comparing them to the cost of owning a boat. Not only is there an investment in the boat itself, but there is insurance, license fee, fuel, maintenance, storage, slip or launching fee. If fishing is of interest, there is the expense of all the tackle. Then the refrigerator needs to be stocked with beverage and food. And with all that, the usage is dependent on the weather! Hell, \$4.18 is not too bad for a memento I can reminisce by, collect, or use towards an award.

The QSL Bureau,<sup>37</sup> which is commonly referred to as just the *bureau*, carries on. It was originally established in the 1920s,<sup>38</sup> and is a system of multiple clearinghouses specifically for QSL cards. They are located in various call-areas of the United States, and similarly in other countries. In my area, the Northern Illinois DX Association (NIDXA) provides the service. One of the negative things about using the bureau is that the process is staggeringly slow. Sometimes I might need to wait a year or two before I receive a QSL card. Therefore, I only use it to reply to QSLs I receive via the bureau, or for cards I want but willing to wait for. Understandably, the bureaus need to offset their rising costs periodically. At the present time, I send \$10 to NIDXA, which they apply to my account. That is then drawn upon for the cost of postage to mail received cards at their location (the area nine bureau) to me. When my account gets close to being depleted, they will enclose a note along with my bundle of QSL cards to let me know. It is an inexpensive way to receive a quantity of cards but not so to send. To send cards through the bureau is a little more expensive. The present-day cost through the ARRL membership QSL Services (bureau) is \$1.15 per

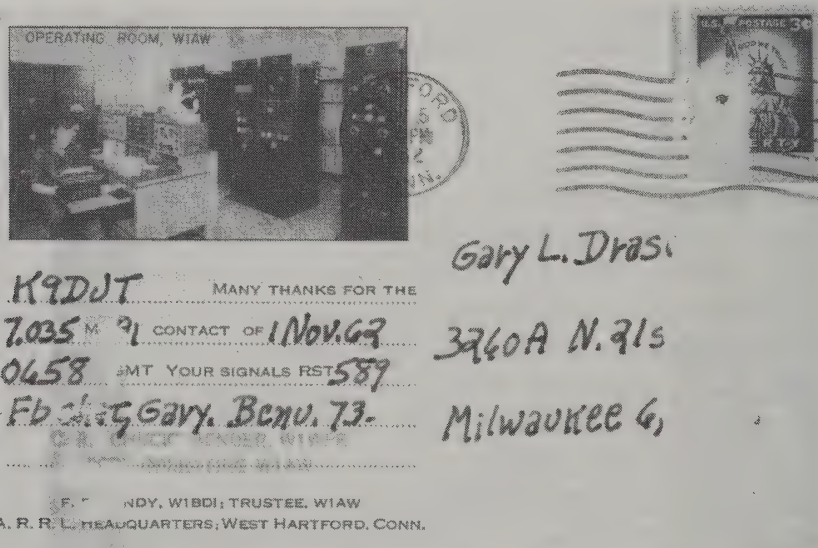
ounce, plus a \$7.00 bureau service fee. My minimum fee is \$8.15 to send seven cards. That equates to \$1.16 per card. If I were to send 14 cards, the cost would be \$9.30 or \$.66 per card. As you can see, the more cards I send at one time, the cheaper it becomes. That is not bad, but it is moreover the reason the process is so slow. In order to save on the bureau fee, operators wait to send out cards until they have accumulated a larger quantity. I could decide to do all my confirmations electronically, but there is a chance that rare DX station does not QSL in that manner.

I need to determine what type of confirmation is best for that recent QSO I had. Do I want a card to add to my collection? Or maybe I want a card because the QSO had been meaningful. Maybe I only need a verification to put towards an award. It might not be entirely up to me, but rather on what the operator on the other end is willing to do. As I stated earlier, if we want to find out if he or she does QSL, or how, check their QRZ.com page. If they are worth their salt, they'll post it there. The same goes for those that do not require a SASE. They normally point it out on their QRZ.com page as well.

The electronic means of confirming a QSO is essentially made up of two different systems. One is LoTW by the ARRL and the other is eQSL.<sup>39</sup> Dave Morris, N5UP, first created QSLCard.com in 1998 and then eQSL in 2000, and remains to be the owner/webmaster. The eQSL structure has three membership levels available. A Regular membership is free, a Bronze is \$12 and Silver is \$30 per year. *CQ Magazine* accepts eQSL for the CQ WAZ, CQ WPX, CQ DX, and CQ USA-CA awards. The ARRL does not recognize eQSL as a valid confirmation even though eQSL created an "Authenticity Guaranteed" program. Therefore, it is my belief, the eQSL company created their own set of awards, which more or less mirror the ARRL, e.g., Worked All States (WAS) and DX Century Club (DXCC). If you are satisfied receiving an eQSL award and want to know more about the program, you may find them at



QSL card received at age 14, General Class license. Take note of the 3-cent stamp. (G. Drasch photo)

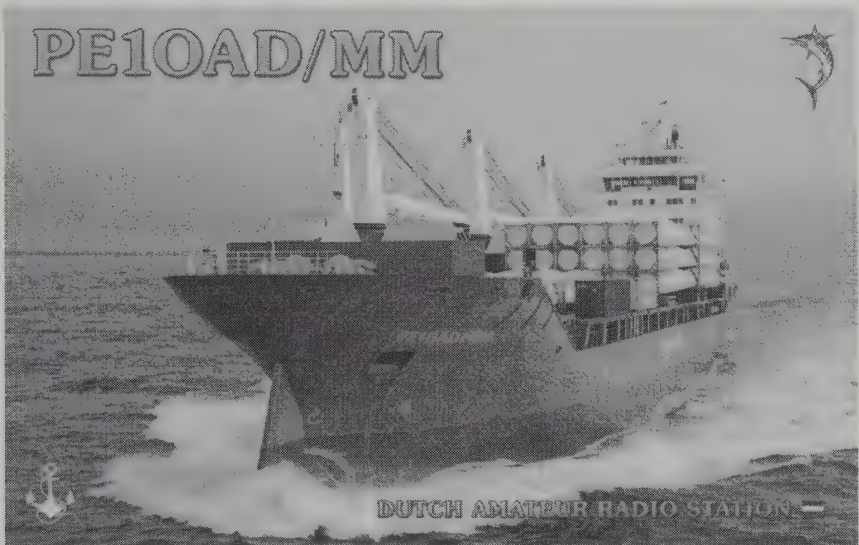


Back of Card. (G. Drasch photo)

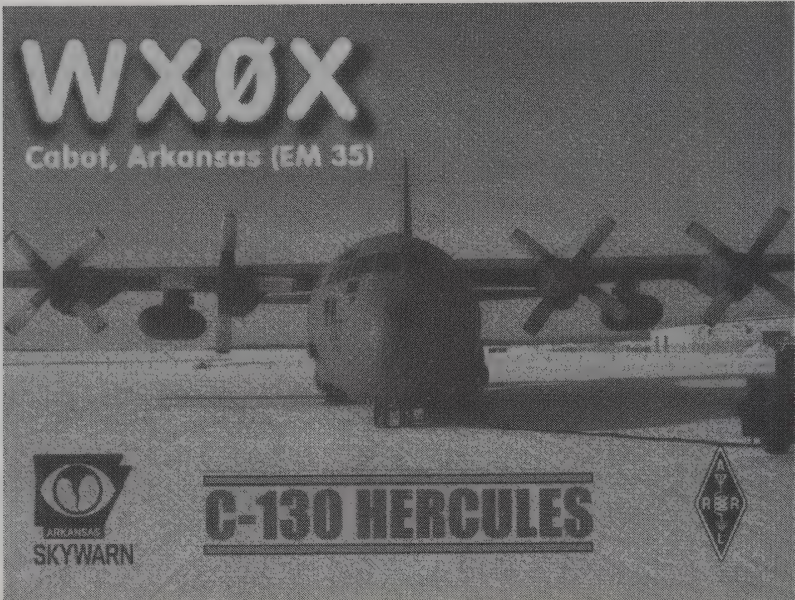




QSL confirming QSO with the DXpedition on their way to Heard Island.  
(G. Drasch photo)



QSL confirming QSO with cargo ship on the Atlantic. (G. Drasch photo)



QSL confirming aeronautical mobile. (G. Drasch photo)

Gary,

Good talking to you after our long weekend of flying around Texas in our C-130H. We spent the weekend providing a flying platform for our aero-medical crews to complete their training.

Thanks for the QSL!

73! Shane Lee WXØX/AM  
MAJ, USAFR

C-130 Hercules of the 517th Airlift Squadron "Firebirds." Photo taken March 2007 in Galena, Alaska. One of my last flights on the "Herc" while in the Arctic. The temperature was -26F/-32C.

WXØX@arrl.net

CONFIRMING QSO WITH	DATE	FREQ	RST	MODE	QSL
K9DJT	8/24/14 1844	14.270	5/9	USB	PSE / (TNX)

Back of QSL with personal note. (G. Drasch photo)





QSL from King George Island. (G. Drasch photo)



QSL from Atka Bay. (G. Drasch photo)

<https://www.eqsl.cc/eqslcard/Index.cfm>. However, if you want the *genuine* DXCC, or other ARRL awards, by using electronic confirmations, you will need to use LoTW.

The original idea of an electronic QSL at ARRL came about at a board meeting in the year 2000.<sup>40</sup> After various discussions on how the system might work, it was decided that it would be a *repository* of QSOs, rather than an exchange of emails. At that point, Delta Division Director Rick Roderick, K5UR, present-day ARRL President, spoke up and said, “So, this is like a logbook of the world”?, hence the name. After loads of work by many people, LoTW became a reality. It was implemented on September 15, 2003. What I love about it is that it’s FREE to use by any radio amateur, ARRL member or not. (Expect an application fee per award when using LoTW, which is no different than submitting QSL cards.) LoTW is accepted by *CQ magazine* for only one award at this time, but negotiations to add others are in the works. If you are interested in using LoTW, you need to go to this website: <https://lotw.arrl.org/lotw-help/> and make an application for a digitally signed *Trusted QSL* (TQSL) certificate. It is a little bit of a hassle, but simply follow the instructions, and you will be fine. I am happy with the system and have saved a ton of money using it. If you do implement LoTW, I highly recommend that you spend some additional time to incorporate it into your logging program. By doing so automates the up and down loading process of QSOs (all that needs to be done is to insert the LoTW paths and passwords). You might also need to find the appropriate buttons in your logbook software and place them on the toolbar. It is well worth the time spent.

Once the integration is complete, in the simplest terms, this is how it works. Let’s say you had several QSOs and you entered them into your logging program. At this stage, you need to highlight or tag the QSOs you want to upload to the ARRL LoTW server. Numerous logging programs have two buttons relating to LoTW, upload and download. Press the upload button. The LoTW server identifies your TQSL, and a dialog box is displayed showing the progress of your



upload. When it is done, click the *Finish* button and the dialog box closes and you are done. Those QSOs you uploaded have become QSO records in your LoTW account. What needs to happen afterwards, is that the other stations, the ones you had the QSOs with, must upload their logbooks to LoTW too. Suppose that a few of the stations you worked did upload their logs. LoTW then compares all your records, against all the records of other users, and finds that there are matches. It then tags both sets of records as verified. OK, let us say that tomorrow night you decide to see if you have received any confirmations on those QSOs. (In LoTW, they are referred to as *verifications*.) You go to your logbook program and press the download button, and again a dialog box opens. This time there is a calendar displayed, and you select a date of how far back you want to go in time for a download. You should not select a date any earlier than the date you started uploading QSOs to the server. Press OK when done. At this juncture, the LoTW server again identifies your TQSL in your PC, begins downloading data, and tags all records in your logbook that had a match. Once those QSO confirmations (verifications) come through, you can start using the various tools in your logging program to sort and/or show your progress towards an award. You may alternatively go into your LoTW account on the ARRL website and view all your QSOs, which have been verified and applied towards an award. LoTW is quickly becoming the standard for electronic confirmations; it is thoroughly supported, and uncomplicated to use once it is setup.

If the DX bug has bitten, and you are serious about tracking your DX numbers and QSLing as I, you should consider using *Club Log*.<sup>41</sup> It is an online tracking and statistics tool for DX-ers. The program was developed in 2007 by Michael Wells, G7VJR, and has approximately 194 Clubs, 47,156 users, and 64,913 callsigns in its database. It works similar to LoTW in that all the participants upload their logs to it, but then takes the results beyond the matching of QSOs. It allows users to create all sorts of charts and graphs showing their progression towards an award. Besides log matching, there is a Log Inspector that permits a user to test a callsign to see if it is valid or

not. There are QSL charts that display matched QSOs along with OQRS (Online QSL Request Service) indicating buttons, which allows users to request a QSL through the service. Another feature is a DX cluster imbedded within the site that compares a users log with recent spots of DX stations that is not in theirs. It shows the day and times they have been spotted, which gives an operator the opportunity to chase those callsigns the next day around the same time and frequency. The user will find different leagues they might want to join. These show how friends stack up against friends within a club, or how one club compares to others. Club Log shows the number of contacts and the percentage of contacts, he or she made using CW, phone, and digital each year. If you choose to try it, upload your complete log using the *ADIF* format (Audio Data Interchange Format), and start poking around using the different buttons. You are not going to hurt or break the software, and you will discover how useful this tool is. All it takes to create an account is to sign up at <https://secure.clublog.org/loginform.php>. Recently, Club Log announced it has been accepted as the first Trusted Partner for LoTW. What that means, is we may take our LoTW TQSL certificate and upload it to Club Log. Once set up, we can mouse over to the lower left corner of the Club Log menu bar and click on "Sync LoTW." And it does precisely that, it synchronizes LoTW with Club Log. We no longer need to upload our logbook to both servers, simply either or. I love it!

I cited OQRS<sup>42</sup> while explaining Club Log and I want to add that you may come across the same service when checking a DX station on QRZ.com or on their individual website. I look at OQRS as a hybrid means of obtaining a QSL card because the request is done electronically, but the card is physically mailed. OQRS was created in March 2003 by DXpedition leader Chris Sauvageot, DL5NAM, and then named and developed by Bernd Koch, DF3CB. They were both with the Sudan, STORY, DXpedition at the time. OQRS is available in different ways and has become a conventional term. It is at your disposal on DXpeditions websites, QSL manager's sites, and in Club Log. DXpeditions literally make thousands of contacts and in truth

are not interested in receiving our cards. They want to accommodate us, the award chasers, with their QSL as quickly as possible. Using OQRS eliminates the cost, time, and need for the average ham to mail his QSL to the DXpedition in order to receive theirs. This is the process. After choosing the appropriate website for your OQRS, you need to fill in your information into the online form, i.e., your callsign and mailing address of where you want your card sent. You then are given a couple of payment options. One might be no-charge, where the card is sent through the bureau (mucho slow). Another might be a minimum charge of \$3-5, and another which allows you to make an additional donation to go towards the expenses incurred by the DXpedition. You decide and pay the fee via your PayPal account. Besides receiving your QSL card so much faster, you'll receive your LoTW verification more quickly too, that is if the DXpedition uses LoTW.

Are you ready to start collecting those QSLs and Awards?





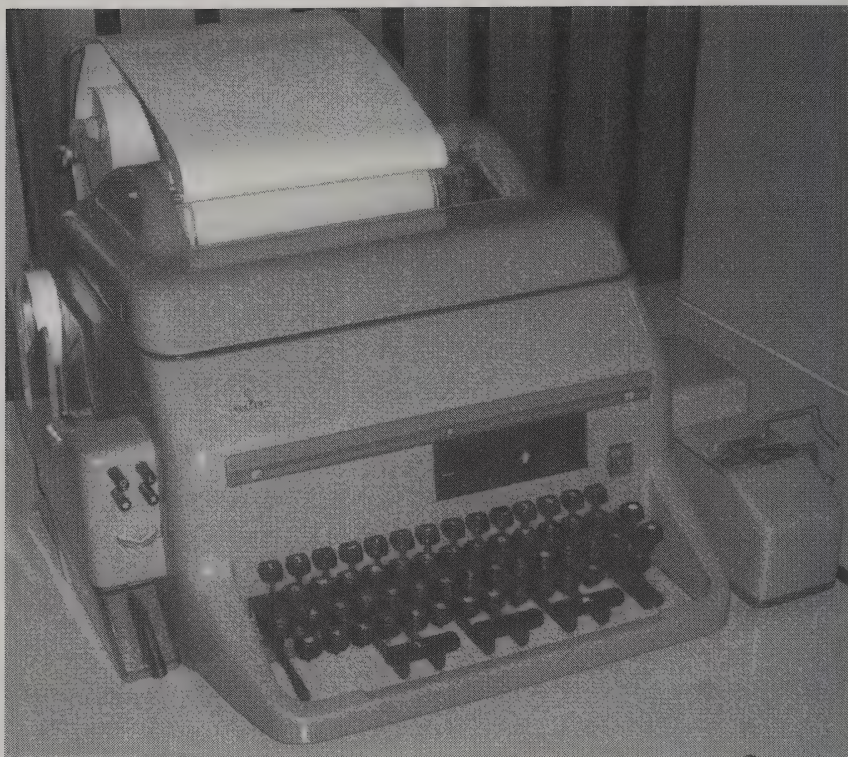
## Chapter 7

# Digital Modes

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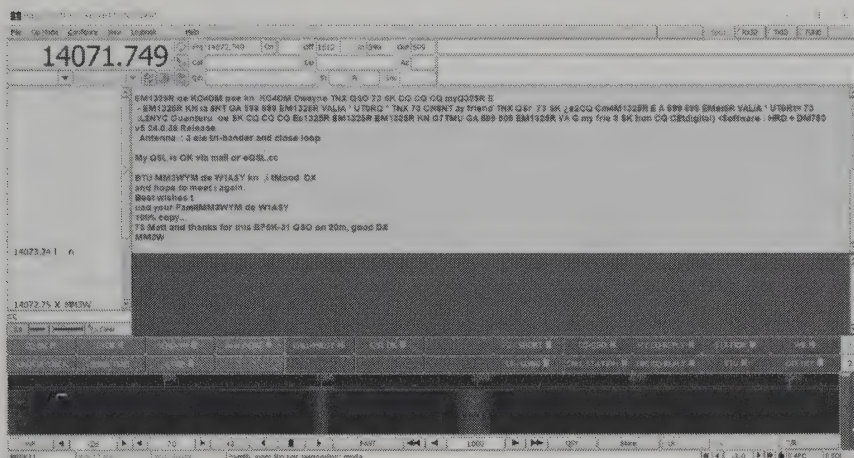
The digital modes weren't around 50 years ago as they are today. Okay, RTTY was, and if you were around then, you recall it as being radio Teletype®. The system used electromechanical teleprinters between two locations. The US Military embraced and widely used radio Teletype®<sup>43</sup> from the 1930s on into World War II after the Navy first successfully communicated between an aircraft and a ground station in 1922. I always thought those large, noisy, paper guzzling, electromechanical teleprinters were cool, but then, I felt the same when I saw my first dot matrix printer. When the RTTY signal was heard on the ham bands, it was always those weird tones that randomly changed in frequency. The only hams using it then were gents that managed to obtain old surplus equipment, therefore the mode was not all that popular. Things changed in the 1980s when computers running emulation software started replacing the teleprinters. RTTY became known as a digital mode, and by using a PC and a sound card interfaced with an HF transceiver, any ham was able to operate not only RTTY, but other digital modes as well—without consuming any paper! I venture to say, the two renowned are PSK31 and RTTY. Other digital modes, approximately twelve popular ones, all sprouted afterwards. Some of them are: PSK63, PSK125, MFSK, MT63, Hellschreiber, Packet, Pactor, Throb, Olivia, Contestia, Domino, and Thor. A good list of digital modes, of what they sound like and the way they look on a waterfall display, can be found at [http://www.hfradio.org.uk/html/digital\\_modes.html](http://www.hfradio.org.uk/html/digital_modes.html).

In 2001 Joe Taylor, K1JT, introduced a suite of *weak signal*<sup>44</sup> (WSJT) digital programs primarily for the VHF bands, but more specifically for *moonbounce* (EME) and *meteor-scatter*. The first was JT65, and



*Fernschreiber T100 Siemens Teletype® machine. (Google for reuse photo)*

then JT9, but you will now find those used on the HF bands. Instead, JTMS, FSK441, and JT6M are the latest modes used for EME and meteor-scatter. Joe recently created one for weak signal *sporadic E* called FT8, which is outstanding for 6-meters. This mode is so robust that it works with signals that are too weak to be heard by the human ear. FT8 has the capability of decoding signals close to 20dB below the noise floor and is considered a *game changer* on the HF bands. Although the K1JT suite was designed for VHF, I have often see the JT digital modes using an HF frequency spotted on the cluster. Another Taylor contribution is *WSPR*<sup>45</sup> (pronounced “whisper”), a program, and name, which stands for *Weak Signal Propagation Reporter*. WSPR collects signals and then generates a reception report that is uploaded to a database at WSPR.net.

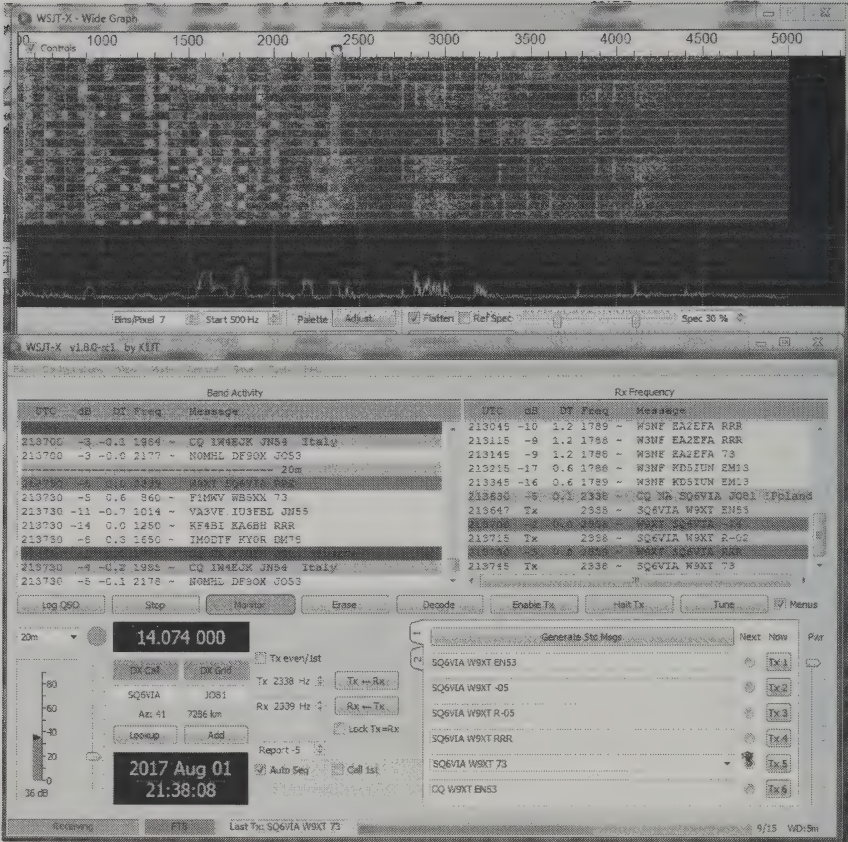


Screen shot of FLdigi application operating PSK-31. (G. Drasch photo)

A variant aspect of the digital modes is *Slow Scan TV*<sup>46</sup> (SSTV) that resembles a still picture sent on a FAX machine but is actually displayed on a monitor. SSTV, despite what its name implies, is considered a *digital mode* because it is a form of digital modulation. It is not that popular anymore but it soldiers on.

If you want to become active using digital modes, you will need an internal soundcard in your PC, but depending on your radio, you might need an additional soundcard between the radio and your PC too. My Elecraft K3 does not require one. I only need to run two audio cables, with 1/8" plugs at both ends, between it and the PC, audio-out of the K3 to line-in on the PC, and audio-in of the K3 from audio-out (speaker) of the PC. My Yaesu FT-2000 that I use at my cabin is different though. It does require an external soundcard. Among others, the three popular brands of external soundcards are Signalink, West Mountain Radio, and Timewave. Any of those, in addition to the normal CAT cable, will work well between the radio and PC. The main purpose of the external soundcard, the likes of a Signalink, is to handle the keying of the transmitter. My Signalink connects to the computer using a USB cable, and then to the radio using a custom cable having an RJ-45 on one end and a 5-pin DIN on the other. The DIN plugs into the Packet port of the Yaesu.





WSJT-X Application screen shot, operating FT8. (W9XT, G. Sutcliffe photo)

Besides the hardware, you must install a program on your PC in order to utilize any of the digital modes. It is the interface between us mortals and the radio. My personal favorite is FLDigi, which does a variety of the digital modes including CW. Yup, CW is a digital mode and can be decoded using this type of software (but the human brain greatly outperforms it). FLDigi performs well and is free. If you are only interested in PSK31 and PSK63, there is DigiPan; it too is a freeware program. Ham Radio Deluxe® (HRD) has a digital module as part of their logging program called Digital Master. Sad to say, it is only available as part of the logging package which there is a charge for. The software moderately resembles an email program; we type in our message and press send. As an alternative,



a good typist can send a message in real-time; text shows up at the other end as he types. Although real-time sending is possible, the majority of operators do not operate that way. The programs allow an operator to create various scripts, as many as 36 in some cases. A script might look comparable to this:

Thanks for coming back to me OM.

Your RSQ is 579 579.

The name here is Gary Gary.

QTH is Port Washington, WI Port Washington, WI.

Age is 69 69.

How copy? BTU

(His callsign) de K9DJT AR

The reply above is sent to the other operator, who was calling CQ, by the press of a software button. It is a common reply, which we might send to others that are calling CQ. Therefore, we save it as a script under a software button of our choice. We may create other scripts relating to our station equipment, weather and items we might enjoy talking about. Before we send the above, we want to send, "his callsign de our callsign." There is a log entry window, dialog box, where we entered "his callsign" before we answered his CQ (the callsign remains there and is used during the entire QSO, until we decide to log the contact). Everything can be done by clicking on various software buttons having an appropriate script.

The upshot of the digital modes is that instead of the Internet, it is all via RF on the ham bands. Unlike having Internet wires and servers involved, the communications are established via RF, from your antenna to your contacts antenna. The likes of CW and SSB, it is instantaneous. Another plus for the digital modes is we can work DX using low power. What a fabulous tool for emergency communications! Two other digital modes requiring the same soundcard interface, and relating to *EmComm* (emergency communications) are *WinLink* and *WinMor*.

I first learned of WinLink from my friend Dr. Stan Kaplan, WB9RQR, who was the Emergency Coordinator (EC) of the Ozaukee Amateur Radio Emergency Services (OZARES) at the time. In fundamental terms, WinLink 2000 is a worldwide system supporting email via radio using non-commercial links to the Internet. It allows radio amateurs to send and receive email using a combination of standard Internet conductivity along with radio-Internet conductivity in areas where standard Internet is unavailable. In any case, messages are composed and sent, or received and read, using a favorite email platform.

In the early days of email, I used a dialup modem in my PC connected to a telephone line. I would create an email message in my program, and when I was done, I would click on a software button to dialup my email server. There would be a bunch of modem tones during the handshaking and it would then connect. My message was uploaded to my service provider and when done, if there were messages waiting for me, they would be downloaded one at a time. That is similar to the way WinLink works, either through the radio or a working Internet connection. It is the same process of data handshaking which takes the time. Data transfer is slow; only 1200 baud for an HF radio connection. With that said, I am able to place an email directly onto the Internet via a radio. It is not as fast as what we are accustomed to, but consider how useful it is for emergency purposes. It is a standard component of the Amateur Radio Emergency Service (ARES) arsenal. If the Internet is disrupted, due to a local or regional emergency, ARES can respond with ham stations to send simple emails to victim's loved ones saying they are OK. Then add maritime mobile into the picture. There are yacht owners that have essentially obtained a ham license for the sole purpose of using email via WinLink. Prior to having a smartphone, I used WinLink at my cabin to send and receive email.

With the goal of eliminating the need for additional hardware such as a Terminal Node Controller (TNC), Rick Muething, KN6KB, and Vic Poor, W5SMM developed the WINMOR protocol along with the RMS Express program. RMS Express resembles an Outlook or

Thunderbird email application. The WINMOR protocol, introduced in 2008,<sup>47</sup> allows users to interface their radio with a PC using a soundcard they might already use for other digital modes, e.g., PSK or RTTY. No longer is PACTOR required to access the WinLink 2000 network.

WinLink on HF requires a sound card as all other digital modes do. I use a Signalink for all of them. After that is connected, you need to install the RMS Express suite on your PC; WINMOR is included. I found it painless to install, setup, and use. Once installed, you need to register your callsign, which then creates an email account for you on the WinLink system. The RMS Express suite works with WINMOR on the HF bands, which is the one I use, but it works with the WinLink protocol on VHF as well; unhappily requiring a TNC again.

I struggle with the practicality of some Amateur Radio Emergency Services using VHF as the RF link. Using VHF for an RF communications link limits the usable distance required to find a node connected to the Internet. Additionally, there are not as many WinLink RF nodes on VHF as there are for WinMor on HF. Rather than only being able to communicate maybe one or two communities away; WinMor allows the user to connect to nodes around all of North America. I have often sent an email using nodes in Texas, Canada, and Minnesota. Those type of distances are far more realistic to use for a major Internet failure and the reason I prefer exercising WinMor periodically.

The Amateur Radio Safety Foundation, Inc. (ARSFI) developed WinLink and supports it through an all-volunteer group. You may find the software and more information at Amateur Radio Safety Foundation (ARSFI) and <http://www.winlink.org>. The RMS Express software suite, which includes WINMOR, is downloadable and is free. Although not mandatory, the ARSFI does appreciate a \$39 charitable donation.

All of the digital modes are fantastic for *little pistols* (low power stations) operating out of an apartment with a vertical or some wire antenna hanging off their porch. Typically, 10 to 25 watts is adequate to get the job done. Somewhere along the line, I failed to mention one of the fundamentals relating to the digital modes, and that is an operator does not need to hear well, or for that matter, at all. It's definitely a blessing for those hams that are struggling with a hearing loss.



## *Chapter 8*

# So Many Things to Do

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Have you ever given any thought to the number of different facets there are in Amateur Radio? There is so much to learn and do that I find it hard to believe a person could take part in all of them during a lifetime. No matter ones age, physical condition, technical expertise, or operating abilities, there is radio communications stuff for all lifestyles. Hams in wheel chairs, those that are blind, and as we know, even the hearing impaired are able to participate in this wonderful hobby.

Below are four lists of different things we can all do as radio amateurs. You will find several highlighted separately after the lists. My hope is that you'll find a couple of activities that truly interest you.

### ***Operating:***

- Hunt for DX.
- Contesting—try SO2R and/or hook up with a contest station.
- Rag Chew.
- Operate CW—operate in the ARRL Straight Key Night.
- Operate RTTY, PSK, and FT8 (digital modes).
- Operate portable as a QRP (low power) station.
- Chase an ARHAB (Amateur Radio High Altitude Balloon).
- Make some QSOs through ham radio satellites.
- Work the ISS (International Space Station).
- Make some QSOs using EME (Earth-Moon-Earth) and WSJT (digital mode).
- Check into some informal nets—HF and FM.
- Become a net control operator.

- Participate in public service nets.
- Get involved with the—NTS (National Traffic System).

***Community Involvement:***

- Join a local and/or regional radio amateur club(s).
- Become a VE (Volunteer Examiner).
- Take ham radio into a science class at your local high school or middle school.
- Volunteer as an ARRL manager or coordinator.
- Create and provide a presentation to various radio clubs.
- Become a QSL manager.
- Operate during Field Day or at a Special Event.
- Attend Hamfests—maybe assist with running one through a club.
- Join ARES (Amateur Radio Emergency Service).
- Get involved with the Red Cross as a communications resource.
- Go on a DXpedition.
- Activate a SOTA (Summits on the Air) summit.
- Help provide communications for parades, bike-rides, walks, and runs.
- Get involved with the Amateur Radio Lighthouse Society, and/or active a lighthouse.
- Become an *Elmer* for a new ham.
- Teach licensing and/or CW classes.
- Do some Fox Hunting (Yup! The original Geocaching and Pokémon-go).
- Activate an IOTA (Islands on the Air) island.

***Technical:***

- Design and build your own antennas. (Especially wire ones!)
- Help others with their tower and antennas.
- Make your own cables and accessories.
- Plan and assemble your station. (Likely multiple times.)
- Build a kit. (They are making a comeback.)

- Restore and/or collect boat-anchors. (You know; the ones you always wanted as a kid.)
- Build a 12VDC power supply—design it or get plans from a book or article.
- Build a linear amplifier—there are numerous plans available.
- Construct a dummy load.
- Design and build an antenna tuner.
- Build a portable QRP station.
- Put a “Go-kit” together for emergency use.
- Install and host an FM or digital repeater.
- Setup and host a WinLink node.
- Collect and restore old keys and/or microphones.
- Setup a bench for experimenting. (Pick up ARRL’s Hands-on Radio Experiments, 1 & 2, by Ward Silver, NOAX.)
- Refurbish old test equipment.
- Install a mobile HF and/or FM radio into your vehicle.

Are you interested in wallpapering your shack? There are numerous awards to chase—more than you can imagine. The list below is only a partial of what I believe are the more popular ones in the United States. Every country represented by the IARU literally offers some form of an award for operating expertise. There is even a website hosted by K1BV dedicated to identifying awards worldwide at <http://www.dxawards.com/>.

### ***Proficiency Awards:***

- WAS (Work All States)
- Five-Band WAS
- The Triple Play award (WAS using phone, CW, and digital modes).
- DXCC (DX Century Club).
- Five-band DXCC.
- DXCC Challenge.
- WAC (Worked All Continents).
- Five-band WAC.

- WAZ (Worked All Zones).
- Five-band WAZ.
- IOTA (Islands on the Air).
- SOTA (Summits on the Air).
- WACA (Worked Antarctica Callsigns Award.)
- VUCC (VHF-UHF Century Club).
- County Hunting Award (*CQ Magazine's* USA-CA Award program).
- RCC (Rag Chewers' Club certificate - Society for the Preservation of Amateur Radio.
- Work towards a special onetime award, e.g., NPOTA (National Parks on the Air) or the Centennial Challenge.
- Create your own goal—as my friend Dave, KJ9I, by working as many stations as he can with “DX” as a suffix in their callsign.
- Collect QSL cards.
- Collect Certificates and/or QSL cards from Special Event Stations.

Did you find any fascinating enough to plow in to? Are you able to see how some have the potential of becoming an obsession? With all the stuff listed, I am unable to understand why any active ham would be bored nor need a job after retirement to keep busy.

The following is the list of activities I chose to highlight—what they are, and how they function. I'm only going to touch upon each one because of the amount of specific information readily available elsewhere.

### ***Rag Chewing***

Many non-hams always ask me, “What do you talk about?” The answer is anything and everything. The conversation could range from radio equipment, antennas, DXing, Contesting, fishing, hunting, camping, family, work, history, geography, religion, politics, model railroading, piloting airplanes, to our daily aches and pains. Everything is open for discussion. It is no different from



having coffee with a bunch of friends at some greasy spoon in the morning. We hams refer to it as *rag chewing*. Unlike some of the other things we diddle with, rag chewing has been around since the dawn of ham radio. You may have noticed that there is even a certificate available for rag chewers.

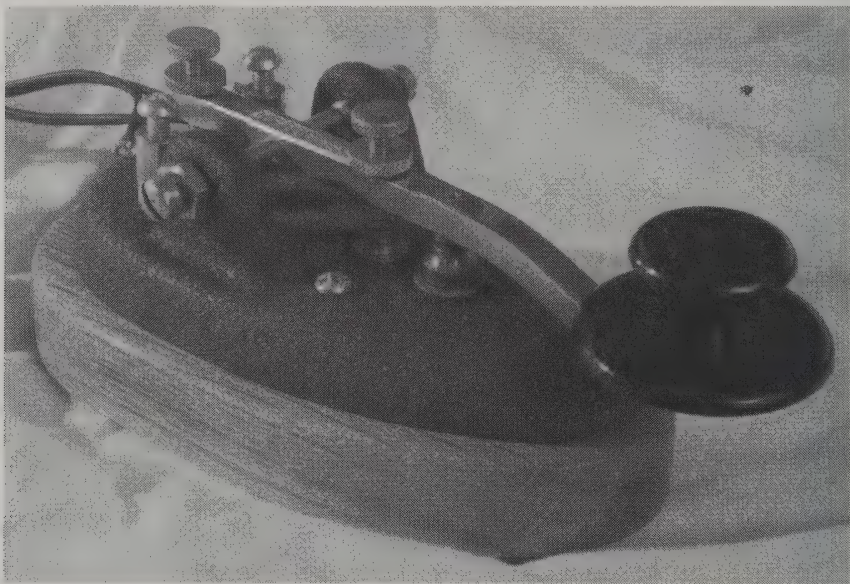
I am bringing it up here for those that might be uncomfortable to engage. Having a conversation with a person we are meeting on the air for the first time should be pleasing. But it isn't necessarily so for all—especially for a bunch of us radio geeks. Every operator's personality is different so it is different for each of us. In many cases, technical and engineering type people, which make up a large portion of ham radio operators, would much rather chase electrons around the shack (experimenting, building, configuring and repairing) than to talk with a human being. And that is OK; it's part of the hobby too.

An essential part of a good conversation is not as much about talking as it is about listening, and the way to get the other operator to talk is to ask questions. Common interests are the key in developing a conversation, and one of the easiest ways we can uncover those are by looking at the QRZ.com page of the other operator right at the beginning of the QSO. Without delay, we can open up saying, "I see on your QRZ page that you have a pair of Shelties. I only have one dog, a Golden Retriever, and my *XYL* (wife) and I love him as if he is family." Other opening questions might be, "So John, besides ham radio, what do you do for fun?" Or maybe, "I recently retired from the fire department after 35 years. Are you still working or are you retired too?" Those are the type of questions that get things rolling. Better yet, is if the other operator starts asking questions of us. The obvious commonality is ham radio, ranging from station equipment, to antennas and how-to-do. I am always amazed at the number of knowledgeable people that make for interesting conversations. During our QSOs, we need to be aware of the fact that our conversations are not private, and that any number of people might be *reading the mail* (listening), even

small children. For that reason, we should all be discreet regarding our subject matter. On the contrary, I hear operators that sound as if they do not care.

### *Operate CW*

If you are a person returning to this hobby after a 40 to 50 year hiatus, I know you know the code. The Morse code that is! As me, you have not forgotten it. You simply need some practice and polishing to regain your proficiency. There are many tools, which can help you compared to when we originally learned the Morse code. I cited some applications I use to help me practice code in the contesting chapter. One of them is the Koch application on my smartphone, which I use while driving alone. (It's much better than listening to the news nowadays.) Browse the Internet and you will find a few organizations dedicated to CW and keeping the art alive. All of them have one commonality; that of honing and improving the radio amateurs Morse code skills.



*My Grimmer-Wilson straight key. (G. Drasch photo)*

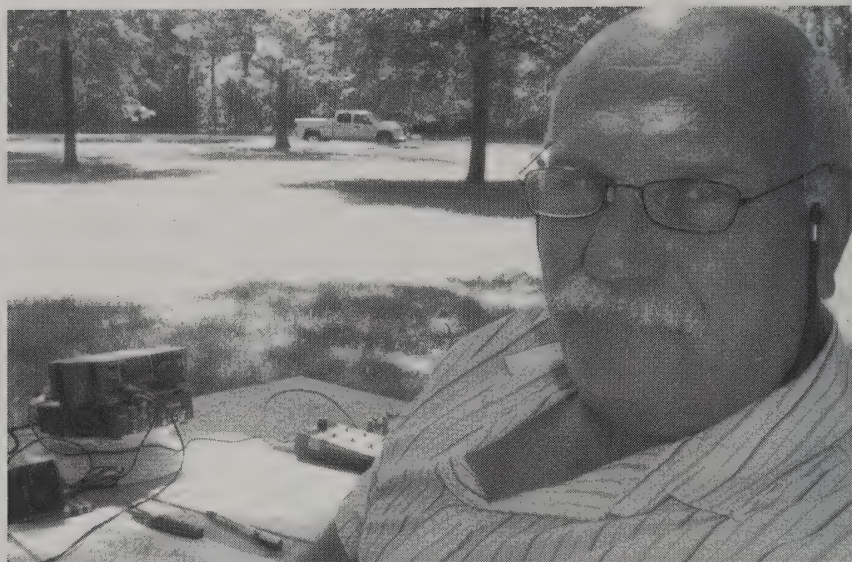
If you're interested in getting back on the air with CW and having some causal, slower speed QSOs, I recommend that you look into the Straight Key Century Club (SKCC). I joined them after Straight Key Night this past year. They have achievement awards AND a *monthly* Straight Key Night! Electronic keyers are not allowed. The whole idea is to keep the tradition alive by only using mechanical keys, i.e., straight keys, bugs, and side-swipers (cooties). Check them out at <http://www.skccgroup.com/>. Another one is The International Morse Preservation Society (FISTS). They have chapters in the Americas, Down Under, East Asia, and Europe promoting the preservation of the Morse code. Their informative website can be found at <http://www.fists.org/>. The last one I am going to comment on is the CW Operators' Club (CWops) at <http://www.cwops.org/>. I have many DXing and contesting friends that are members of this group. In order to join, you will need to find three sponsors who you have worked, using CW at least two times each in the last 12 months. One of the neat things is that they have a CW university. The information you need regarding membership, of not only CWops, but the others too, can be found on their websites.

### **QRP**

QRP was never much of a topic 50 years ago. I know some operators that consider running less than 100 watts as QRP. In retrospect, that would have put most of us in the QRP arena while we ran our 50 and 75 watt input transmitters years ago. But that has all changed. We did not have the technology 50 years ago to miniaturize radios as we do in this day and age. The recognized standard of QRP today is 10 watts input or 5 watts output or less. All sorts of QRP stations are out there, from commercially manufactured to homebrew circuits stuffed into an Altoids tin. QRPing is primarily done using CW or a digital mode, but you will occasionally hear a few hams using SSB too.

Rick, NK9G, a friend of mine in our DX club, loves QRPing. He is better known as, "Mr. 88 and Sunny," because of his frequent





*NK9G operating QRP portable at Sheridan Park in Cudahy, WI. (NK9G, R. Mc Gaver photo)*

weather reports to us Wisconsinites while he winters in Arizona. He has a separate operating position setup at his home QTH primarily for QRP. During the winter months, he operates QRP portable using a Buddipole™ antenna and an Elecraft KX3 from Arizona.

Could QRP be some form of an addiction? I believe so. If you check out the ARRL website, you will find a couple of articles titled, “QRP: More Than a State of Mind,” and another one, “Confessions of an Inveterate Milliwatter.” That alone, says it all. Try it sometime. You will be amazed what is possible with such little power.

### ***Amateur Radio High Altitude Ballooning***

ARHAB (Amateur Radio High Altitude Ballooning) is a means to study and educate enthusiasts of aerospace science using ham radio. The first ARHABs<sup>48</sup> took place in Germany around 1964, and then in Finland during 1967. To my knowledge, there was nothing similar taking place during those years in the United States, at least not locally.



This is how it flies (pun intended). A group of enthusiasts, typically a club, decide they want to launch a *HAB* (High Altitude Balloon) carrying a payload of stuff; maybe a radio with an *Automatic Packet Reporting System* (APRS), a Global Positioning System (GPS), weather station telemetry, a camera and FM repeater. Basically, anything the balloon is capable of carrying, that can provide data for the scientists on the ground.

APRS is based on a ham radio digital communications information channel. It provides a ham who is operating mobile the ability to monitor any area for 10 to 30 minutes, messages, weather, bulletins, alerts and a map of all the activity. The APRS data is typically transmitted on a single shared frequency in each country (in the United States it is 144.39-MHz), and it might be repeated through digipeaters (a digital repeater). APRS was developed by Bob Bruninga, WB4APR, in the 1980s.<sup>49</sup> The following website provides the details of how APRS operates: <http://www.aprs.org/>.

When APRS is used in association with the balloon, the telemetry might be stored on board, but the important GPS coordinates are transmitted, then received and monitored by many hams tracking the movement and location of the balloon. This is done using a PC and special mapping software showing exactly where the balloon is at all times. It is not unusual to discover several hams using notebook PCs in their cars while they chase the balloon, or let us say, more importantly, its payload. Then there are those amateurs that follow the balloon on their home PC while they monitor the radio communications between the vehicles, all for the fun of it.

The latest radio balloon launches, missions, and data from past events can be found at <http://arhab.org/index.php>. Enjoy!

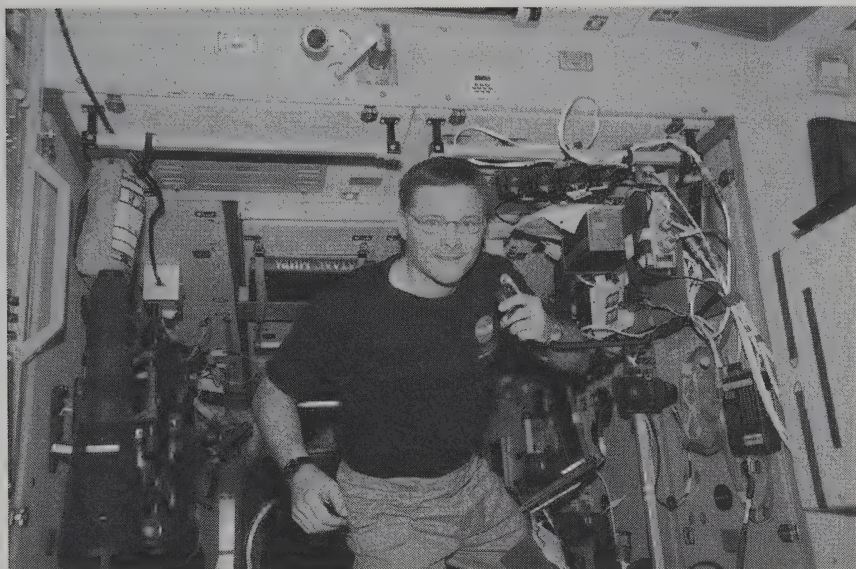
### ***Satellites and the International Space Station***

It is hard to believe that radio amateur satellites developed their roots in December of 1961.<sup>50</sup> At the time, I was perfectly happy having a General Class license and operating on the HF bands. Right

after the launches of the Explorer 1 satellite on January 31, 1958, a bunch of radio amateurs on the west coast, began thinking of creating a satellite for ham radio. They later referred to themselves as project OSCAR (Orbiting Satellite Carrying Amateur Radio) with the idea of building and launching ham radio satellites. The group had conversations with the ARRL and the United States Air Force, which over time lead to a piggyback ride of OSCAR 1 with the Discoverer 36 spacecraft. The craft was launched from Vandenberg Air Force Base in California, and by December 12, 1961, entered a low earth orbit. This had to be an exciting time. This 10-pound bird (satellite) that had been built in basements and garages was in orbit! OSCAR 1 was not capable of providing any type of two-way radio communications yet, but rather carried a beacon transmitter, providing ionosphere propagation data and internal temperature telemetry of the bird. During its short existence of 22 days, over 570 hams in 28 countries, sent their observations to the OSCAR Project Team Data Collection Center. Although OSCAR 1 was lost as it burned reentering the atmosphere, the event marked the beginning of ham radio into space. OSCAR 2 was carried aboard a Thor Agena B rocket on June 2, 1962. It was an improved version of OSCAR 1 and established a continuous improvement element to the amateur program. It was OSCAR 3 though which carried the first radio amateur linear transponder. It received signals near 146-MHz (the uplink) and retransmitted them near 144-MHz (the downlink). Around 1000 operators in 22 countries were heard using it during its 18 days of life. As of 2009, the OSCAR program has extended out to OSCAR 68, and is carrying an FM repeater.

On page 1-20 in my 2010 edition of *The ARRL Satellite Handbook*, is a table of all the currently active amateur radio satellites. There are 19 listed, with one being the ISS, showing the frequency of the uplinks and downlinks along with the mode(s) of operation. If operating through satellites is of any interest to you, It is imperative that you pick up a copy. Steve Ford, WB8IMY, is the author.

Not only does the ISS carry a repeater onboard, it is possible to



*Doug "Wheels" Wheelock, KF5BOC, uses the ham radio system during ISS Expedition 24 and 25. (Google for reuse photo)*

have a QSO with an astronaut on the ISS. Dr. Owen K. Garriott, W5LFL, was the first astronaut to take a ham radio with him into space. It was November of 1983. He used a Motorola walkie-talkie held an antenna up to a 24-inch window of the Space Shuttle Columbia. That mission was the beginning of radio amateur activity in space, and hence The Space Amateur Radio Experiment (SAREX) was developed. Ham radio gear became a customary component on the ISS in 1997,<sup>51</sup> requiring more or less all astronauts to obtain an amateur radio license. One of the goals is to establish communications with classroom students worldwide. This is accomplished through ham radio clubs, that set up temporary, redundant, ham stations at various schools to ensure contact with the ISS.

One of the cool things about operating through satellites, is an operator requires only a Technician Class license, a dual band walkie-talkie, and an inexpensive antenna. It is probably the cheapest means of talking around the United States on the ham





*Antenna used for live student chat with International Space Station.  
(Google for reuse photo)*

bands. We might be in our own backyard with a wide view of the sky, using a handheld radio with an antenna on a tripod, or using the same setup operating portable, while looking out over a bluff somewhere. On the other end of the spectrum are larger radios and antennas using a multi-axle rotor, all interfaced with a PC.

One of the key ingredients when operating through a satellite is to know where it is in relationship to our present location. Out of that need arise satellite-tracking software. The applications determine how high or low a bird is tracking our horizon, while showing us what regions of the earth are in range for a QSO. Software such as this provides us with the next opportunity to intersect a path, while displaying the satellites operating schedule, and its antenna orientation. In addition, if we interface the PC with the antenna rotor, the software will control both the Azimuth and Elevation in order to track the bird as it travels. Connecting the PC to the radio also permits automatic frequency compensation to offset changes



of Doppler shifting. Moreover, it is another reason to interface a personal computer with a radio!

A good satellite primer is downloadable from the ARRL website at <http://www.arrl.org/files/file/Technology/tis/info/pdf/0004036.pdf>. (Steve Ford, WB8IMY, the editor of *QST* wrote it.) By the same token, you might want to look into an organization called Amateur Radio in Space (AMSAT), which was created to continue the efforts started by Project OSCAR. Scope them out at <http://www.amsat.org/>. Lastly, for information on Amateur Radio on the International Space Station (ARISS) go to <http://www.ariss.org/contact-the-iss.html> and [https://science.nasa.gov/science-news/science-at-nasa/2000/ast21aug\\_1/](https://science.nasa.gov/science-news/science-at-nasa/2000/ast21aug_1/).

### ***Earth-Moon-Earth***

Have you ever considered bouncing a signal off the moon? Look around, and you will find a bunch of radio amateurs who do and love it. I have a friend, Ken, W9GA, who is one of those people. He is into anything and everything dealing with 50-MHz (6-meters) and above. The *moonbounce* is often referred to as EME, meaning Earth-Moon-Earth. It is a means of having a QSO with another operator on earth by reflecting (bouncing) a signal off the surface of the moon. To be sure, it is not a full-blown conversation where names and QTHs are exchanged. It resembles a DX contact, which is 5NN and bye. The JTMS, FSK441, and JT6M are the modes of choice. These were created specifically for EME and bouncing signals off meteor-scatter. In order to participate, besides having the correct audio interface, you need to download the K1JT program suite at <https://sourceforge.net/projects/wsjt/files/latest/download>.

It is common to see EME and meteor-scatter enthusiasts having a large antenna array made up of six or more yagis (a gain antenna) stacked and phased. These are aimed at the moon, or meteor-scatter, with a dual-axis rotor, meaning Azimuth and Elevation capabilities. The antennas do not need to be high but rather require enough room to rotate them to an appropriate angle of elevation.



*EME antenna system. (W9XT, G. Sutcliffe photo)*

Without saying, there needs to be a clear view to the target we are bouncing off of. Several interesting links and information can be found at <http://www.arrl.org/weak-signal-vhf-dx-meteor-scatter-eme-moonbounce>. When there, take notice that these same weak signal techniques are applied to both the bouncing of signals off the moon and meteor-scatter. Anyone interested in astronomy might want to take a look at the Amateur Radio Astronomy link: <http://www.nitehawk.com/rasmit/>.

### ***Nets***

A net is a group of hams that show up regularly on the same frequency, on specific days, at a particular time. There are local area nets, regional nets, and wide area nets. If you have a license, you probably recall some of them from years ago. Collins equipment, model railroading, experimental aircraft, missionary, hamfests, astronomy, ARES, and weather are only some of the special interest type nets. They go on-and-on. A few nets in my particular area are the Milwaukee Florida net, the NUT net, the Upper Peninsula net,

Mid-Cars net, The 68 Group net, The Buzzards net, and The Ozaukee Radio Club net. These are referred to as structured nets, meaning they all have a net control operator, a person who is in charge of running the net. He or she might do it for a week at a time or even months at a time. Some of the nets have a means of alternating net control operators on a regular basis. At the beginning of a net, the control operator starts with a preamble explaining what the net is about, and then requests check-ins, which he logs as a list. Once several people have checked in, he starts at the top of his list, and calls the first check-in. He then asks either him or her to make a comment. This could be a specific interest to the group, such as a wood working project, a model plane, to a problem he or she are having with a piece of gear, or an antenna he recently put up. In some cases, each check-in comments about the weather at their location. Some might ask for a signal report from the group as to how strong, his signal is and if his audio is clean or not. It's a means of collecting a quantity of data from a wide area very quickly. It is similar to an Internet forum but the participants are talking with one another live, rather than typing at a keyboard. Somewhere between the beginning and end, it becomes a round table discussion. After the first check-in finishes with his comments, he turns it back to net control who then calls the second check-in to make their comments. This continues until he finishes the list. The net control operator then asks for additional check-ins and adds them to the list. At this stage, he (net control) starts at the top of the list again. Nets usually last about an hour, which means, depending on the number of participants, there could be two or three go-arounds. Some check-ins might comment during their first go-around that they are not going to be sticking around for the second one. This is fine. There are many friendships created through nets. Some nets might have an annual picnic, a breakfast or lunch at the same spot every year, where participants have a chance to experience an *eyeball* (face-to-face) QSO. Nets are run at all different times of the day, and on all the bands including the 2-meter and 70-centermeter FM bands. There are tons of nets. So, how does a newbie, or an oldtimer returning to the hobby, get



involved? Ah, that is where the PC comes into play again. You can find all the structured nets within the ARRL directory at <http://www.arrl.org/arrl-net-directory-search>. The directory is searchable by: NTS area nets, section nets, maritime nets, state nets, NTS regional nets, wide coverage, and local nets. Then by: US state, Canadian province, or US territory; net name, day of the week, frequency and National Traffic Affiliation. The days, times and frequency of each net are listed. No matter what your interest, I am sure you will find a net to suit you.

I referred to structured nets a few times in the above. The purpose being, there is another form of a net, which is more of a get-together than a net. It is common to find small groups of operators on 75 and 160-meters having a lengthy conversation. Although they ID (identify) themselves every ten minutes as required, they do not make use of a *net control operator*. In addition, they do not register themselves with the ARRL directory; therefore they are not listed. They talk as any bunch of geezers would in a garage or barn, and speak up whenever they have a word to say. It is all fine and good except no one is able to see each other's face or mannerisms as they would when face-to-face. Consequently, frequent *doubling* goes on, i.e., two operators talk simultaneously, which royally screws things up. At one time I participated in such a group and decided to leave because it was not fun to operate that way. Although that method of operation does not intrigue me, rightfully so, it does for others.

Of particular interest under the subject of nets, is the National Traffic System (NTS), which is sponsored by the ARRL. The NTS is network of radio amateur stations that is organized and skilled in relaying formal traffic messages throughout the US and Canada during times of emergency. If you have a specific interest in the NTS, you may go to <http://www.arrl.org/nts>.



### ***Volunteer Examiners***

I found it interesting that volunteer examiners date back to 1912,<sup>52</sup> when licensed radio amateurs administered the Amateur Second Class license. In the 1950s and 1960s, licensed radio amateurs administered the Novice, Technician, and Conditional exams. (The Conditional license<sup>53</sup> had the same privileges as the General Class, but was for those in a remote location that were unable to travel to a Federal Building.) In 1984,<sup>54</sup> the FCC reverted to using all volunteer examiners again, creating the VEC system (Volunteer Examination Coordinators) around the country to administer the exams, thereby eliminating the need for applicants to visit a federal building as I had in 1961. VEC organizations, which are responsible for the work of their certified VE's (Volunteer Examiners), are authorized by the FCC. The VEC is the liaison between the FCC and exam applicants. Hams that are interested in becoming a VE, need to hold a General Class or above license and be willing to volunteer their time to administer licensing exams through a VEC. New license, or the upgrade of an existing license, exams are given by a team of three or more VEs. Interested parties can find more information at <http://www.arrl.org/become-an-arrl-ve>.

This might be a good place to delve into a little history behind the restructuring of the Amateur Radio Service operator license.<sup>55</sup> In 1999, the FCC proposed the restructure in order to reduce the number of exam elements and to simplify the licensing requirements. It became official April 15, 2000. Six years later, December 15, 2006, the FCC disposed of the Morse code requirement. By doing so, the FCC eliminated the disparity between the Technician and Technician Plus license. Furthermore, it opened the hobby up to many that had an interest in ham radio, but were held back by the Morse code requirement. Today, there are only three licenses available. The Technician class, which is considered the entry-level license, requiring a 35-question exam. The next is the General class that requires an applicant to hold a Technician class license, and pass a different 35-question exam. And finally, the Extra class, requiring a valid General or Advanced class license, and

satisfying a 50-question exam (the Advanced license had been grandfathered). None of the new licenses requires a Morse code proficiency exam.

That is quite different from the 1951 structure which was Novice, Technician, Technician Plus (1990), Conditional, General, Advanced (1964) and Extra class (all licenses were valid for five years and renewable except for the Novice which was good for only one year and not renewable). In addition, all licenses required the passing of a Morse code proficiency exam. (The Novice class license did become renewable in 1978, and was grandfathered along with the Advanced class, into the 2006 changes.) It was in 1967 when the FCC introduced incentive licensing, where some band spectrum was taken away from General class licensees and divided up between the Advanced and Extra classes. The goal was to get General's to increase their knowledge and skills to help prepare for the up and coming space age. The thing is, from the beginning, ham radio had always been a catalyst for many young people that later became engineers, and our government wanted to draw upon that resource.

My written exam for the Novice license was 20-questions, the General class was 50-questions, but I could not recall how many questions there were in the Advanced or Extra class exam. One of my friends, Jim, K9QLP, helped me out. After some research, he found that both the Advanced and Extra class license exams had a varied number of questions, which was dependent upon the license held by the applicant. If he held a General class, he received credit for that exam. The same held true for the Extra class, if the applicant had passed both the General and Advanced class, he or she received credit for those and only needed to take another 50-question exam. If he or she did not have either of those licenses, the exam would have been 150-questions. Unlike now, anyone could apply for any class license without possessing a lower class. Along with those written exams came a Morse code test of 5-wpm for the Novice and Technician; 13-wpm for the Conditional, General

and Advanced; and 20-wpm for the Extra class. As the story goes during this time, an Extra class licensee held the equivalent of a First-Class Commercial Class license.

I have mixed emotions about the restructuring. On one hand, I can personally empathize with the amateur who needed to take a Morse code test for his license, where nowadays it is issued to any applicant who passes the written exam. Conversely, the restructuring opened the hobby up to many more people, which is one of the reasons amateur radio continues to grow. It is refreshing to see people carry on an interest in learning and using the Morse code, even though they are not required to do so. Thumbs up to them!

### ***Field Day***

It does not matter if a person is a seasoned operator, who has been away from the hobby for a while, or if they are a newcomer, Field Day (FD) is one of the best ways to get involved with other radio amateurs. It takes place every year during the fourth full weekend of June. The ARRL originally organized the exercise in the United States during 1933.<sup>56</sup> According to their website, it has as many as 40,000<sup>57</sup> participants every year. FD is a public service and community outreach event demonstrating emergency capabilities while operating under less than optimal conditions. Many radio clubs and individual hams setup Emergency Operation Centers (EOCs) in public areas, e.g., parks, forests, beaches and alike; using tents, trailers and other temporary shelters. The power source is likely gas generators, or batteries being charged by solar panels. The operating goal, besides creating public awareness, is to make as many contacts as possible on the standard ham bands (WARC bands are not included) within 24 hours. That means many people come and go while others might stay and camp overnight. Although FD is considered an emergency simulation and not a contest, scores are kept and published in *QST*. In my opinion, if we are keeping score, how can anyone say it is not a contest? The fact of the matter is, it's fun; a means of meeting other radio amateurs and becoming an

active shareholder in ham radio. Find your local radio club and ask to join them during the next event. I am confident you will be welcome. It will allow you to see how the new technology intertwines with the old, and presents you with an opportunity to get on the air. As far as that goes, FD is a perfect way for *anyone* who has never been a ham to get on the air for the first time and try it. Many clubs have a *GOTA* (Get on the Air) station, along with an operator, setup specifically for unlicensed persons to try.

Because of all the food and drink, you might need to arrive with a good appetite. I have heard some clubs consider FD to be more about eating than operating!

### ***Amateur Radio Emergency Services***

The ARRL *Amateur Radio Emergency Communications*<sup>58</sup> (AREC) began responding to disasters across the country in the 1930s. The AREC has since been replaced by *ARES* (Amateur Radio Emergency Services). It is made up of licensed radio amateurs that are willing



*W9XT operating CW at Ozaukee Radio Club Field Day (G. Drasch photo)*



to volunteer their time and communications equipment during a disaster. Those who are serious register with their local ARES group, listing their qualifications and equipment. Although ARES is sponsored by the ARRL, any licensed ham is welcome to join and is not required to be a member. Because ARES is providing an emergency service, there is a good possibility of some training involved. To own emergency powered equipment is a plus, but not required to be a member.

My county has an active ARES group named OZARES (the “OZ” stands for Ozaukee county). They host two open repeaters, a VHF and UHF, and have monthly meetings and training sessions. Information about ARES can be found at <http://www.arrl.org/ares>. In Wisconsin, all ARES members are also members of RACES (Radio Amateur Civil Emergency Service). Whereas ARES is sponsored by the ARRL, RACES base sponsorship is provided by the US Government Federal Emergency Management Agency. Another government program, that is supported by ARES, is called SKYWARN. It was developed by NOAA’s National Weather Service (NWS); the purpose is to obtain vital weather information and visual confirmation of such from radio amateurs in the field.

Most, but not all, of ARES communications are performed using VHF-UHF radios. A shack is not necessary. Hams have setup VHF-UHF radios within their homes, in the basement, living room, kitchen, and bedroom. Some may decide to place a dual band antenna outside if they are interested in *bringing up* (communicating through) a repeater that is located a significant distance from them. I have beams on both VHF and UHF but in addition, I have a couple of homebrew verticals in my attic as backups. They both work exceptionally well for the local *machines* (repeaters). An operator might even get by with a handheld walkie-talkie depending on how close he is to a local repeater. If he uses a handheld, there is nothing saying he cannot hook it up to an antenna in the attic or outside. I am able to easily *hit* (contact) our club repeater, fifteen miles away with full quieting (no frying noise),

using my 220-MHz walkie-talkie in my basement and an antenna in the attic. Many Red-Cross volunteers have become VHF-UHF operators by acquiring a Technician Class license after the code requirement was dropped. These bands are important for local emergencies where phone systems, cellphones and Internet services become inoperative, but what about the big picture? How would we communicate around the state, or for that matter around the country? The Red Cross brings in satellite dishes to access the Internet, but what if their satellite equipment malfunctions? What happens if there is a catastrophic failure of the Internet? Are you thinking this is where HF comes into play? You're right. The Red Cross has already started implementing a digital protocol to be used on 30-meters (The 10.1-MHz band) for unassisted communications. The caveat is a General Class licensee is required to oversee the operation of a radio at that frequency. I have confidence the Red Cross has at least one General Class licensee on site during mock operations, as OZARES does. During a TRUE emergency where life is in danger, no one is going to care about a license or for that matter what frequency is being used. The main thing is that the radio operator knows what he or she is doing, and in my opinion, that is what counts.

### ***FM Repeaters and Internet Linking***

Thinking back, this is what I thought was left of the hobby until Lyle, WE9R, straightened me out. Although the concept of repeaters started in the 1930s,<sup>59</sup> it was not until the 1950s when AM repeaters started surfacing, but it was the 1970s when the FM repeater took hold and revolutionized the VHF and UHF amateur bands. What happened in the 1960s was an abundance of surplus FM commercial equipment surfaced due to a growing demand for newer technology. Hams discovered that all this commercial stuff was serviceable and able to operate on amateur frequencies, specifically the 6-meter, 2-meter, and 70-cm bands. This was not only mobile radios but walkie-talkies and repeaters too. During this time, radio amateurs modified these commercial radios to work on their ham bands. This was an era when hams were really hams.

They really understood electronics and were homebrewing a lot of their own equipment. My grandfather would have been one of those guys, if it had not been for the code requirement back then. He would have been delighted to talk with his friends across town through a repeater using a handheld or mobile radio. I have a friend in the Ozaukee Radio Club, Nels, WA9JOB, who primarily operates using the club repeaters, even though he holds an Extra Class license and owns an HF transceiver. Why? Because FM, and his friends on those bands, are what is important to him. It is what he enjoys. By the licensing numbers, it appears there are many people who enjoy doing as Nels. 50-percent of our licensees in the United States hold a Technician class license that is limited to two small portions of the 10-meter band, and then 6-meters and above. They also have some CW privileges on 15 and 40-meters but need to learn the Morse code in order to use them. My belief is that Technicians mainly use the 2-meter and 70-cm bands through FM repeaters, and some of them might use a 220 MHz machine if it is available to them.

I referenced EchoLink and IRLP programs earlier, the ability to connect to an FM repeater through a PC using *VoIP* (Voice over Internet Protocol). It all began in 1997 with the *Internet Radio Linking Project*<sup>60</sup> (IRLP) that continues today and runs on the Linux platform. By 2004, there were over 1200 repeaters and simplex stations using it. This opened the door to the development of another linking protocol called EchoLink. Because of the popularity of MS Windows, Jonathan Taylor, K1RFD, created the *EchoLink* program and wrote a book, *VoIP—Internet Linking for Radio Amateurs*, an ARRL publication. There are pros and cons to both systems. The true computer geek prefers IRLP while the common Joe sticks with MS Windows and EchoLink. No right or wrong, just different.

Nels, WA9JOB, periodically travels to visit family around the country and as the majority of people do, carries a smartphone with him. Nels not only uses the standard features of his phone, but

additionally uses it as a pseudo handheld radio by having installed an EchoLink application on it. It is common to hear him on a local UHF repeater talking with his pals when he is traveling. As I said, EchoLink and IRLP both use VoIP which is the same thing cable companies use to bring telephone service into our homes. As one PC can communicate with another PC on the Internet via Skype, EchoLink and IRLP can do the same using a PC, with a microphone and speaker, to communicate with another PC that is connected to a radio or a repeater. With EchoLink, it is done through an EchoLink software application installed on the PC. Hams are able to connect via a local repeater to a remote repeater of choice, or a PC to a repeater of choice or reverse, via the Internet. All of it is done using the keypad on the microphone of our FM transceiver. An EchoLink RF site, i.e., a link, can be created and used by any amateur licensed operator. I had done this once upon a time. I dedicated a PC and a UHF radio and interconnected them with a RigBlaster soundcard. The PC was running the EchoLink software and had an Internet connection. The radio, which was connected to the PC through the RigBlaster, transmitted and received using the same frequencies as any other VHF-UHF radio accessing a repeater. In my case, it was a UHF machine in Plymouth, Wisconsin. Hams selecting my node in the EchoLink lookup table had the ability to connect to my friend's repeater via the Internet. Plus the reverse was possible. Hams were able to access my friend's repeater using a handheld or mobile radio, and then connect to a different repeater anywhere on the planet by selecting it via their microphone keypad.

The Japan Amateur Radio League (JARL) developed a digital voice and data protocol in the late 1990s that is referred to as *D-STAR*<sup>61</sup> (Digital Smart Technologies for Amateur Radio). The main advantage of D-STAR is that it uses less bandwidth. In fact, D-STAR uses less bandwidth than SSB, AM, or FM. Icom, Kenwood, and FlexRadio Systems manufacture VHF, UHF, and HF products that are compatible with the D-STAR protocol. Unlike EchoLink and IRLP, all the D-STAR repeaters have the ability to find specific radios on the system through its Internet connection. There is no need to call up



any machine first. Instead, the system finds the amateur we are looking for through the D-STAR network. Users of D-STAR are able to communicate via digital voice and short data messages, exchange photos using an IP camera, and access the Internet using a PC radio combination. Sadly, a D-STAR repeater cannot be accessed via an FM transceiver; it only works with a D-STAR protocol type radio. D-STAR radios include a GPS and support APRS.

There is a thing going on within the digital FM modes in amateur radio that is not much different from the historic battle between the Beta Max and VHS video formats. Yaesu introduced their digital version called *System Fusion* not long after D-STAR. From what I understand, both systems are similar except that System Fusion has Automatic Mode Select (AMS™). The Yaesu digital repeaters and digital transceivers can accommodate FM as well as digital, and automatically selects the correct mode based on what is received, i.e., FM or digital. System Fusion supports APRS and has a GPS as well.

Being no different than when SSB originally emerged, these new modes remain to have some skeptics. Because bandwidth is such a concern in all electronic communications today, I cannot help but believe that digital radios are the future. After all, it is already taking place on the commercial side of the two-way radio business.

### ***Islands on the Air***

*IOTA* (Islands on the Air) is an awards program run through the *RSGB* (Radio Society of Great Britain: the British equivalent of the ARRL). They took the program over from Geoff Watts<sup>62</sup> in 1985. Geoff was a shortwave listener and came up with the idea in 1964. The purpose was to encourage amateur radio operators to make contacts with other hams located on islands.

*IOTA* consists of 1200 groups of ocean islands, with different qualifying islands in each. The qualifying islands are referred to as *counters*. The goal for an island chaser is to confirm at least one

counter in as many of these groups as he can. That sets him up for the possibility to earn up to 18 different certificates, graded by difficulty. The activator, the one who sets up and operates from an island, qualifies for an award as well.

A fellow member of my DX club, Wayne Long, K9YNF (SK), always spoke of what he had accomplished in the IOTA program. Wayne reported islands he had worked during the time the rest of us were reporting DXCC slots, and always referred to an IOTA award as being prestigious, and rightly so. He worked 710 islands and was proud to be on the *IOTA Honor Roll*. (He was also a *DXCC Honor Roll* member.) Rest in peace my friend...

The program has about 15-20,000 followers which makes it one of the more popular award programs around. You can find all the information regarding IOTA at <https://www.rsgbiota.org/info/>.

### ***Summits on the Air***

It was March 2, 2002, when SOTA<sup>63</sup> (Summits on the Air) became a reality. England and Wales adopted the program first, followed by Scotland. The idea of creating an awards program was the brainchild of John Linford, G3WGV, who came across Richard Newstead, G3CWI; he was running a website called *European Adventure Radio* at the time. It was decided SOTA was to be an awards program and not a club or society. That decision made it possible for all radio amateurs and *shortwave listeners* (SWL) to participate without the need to be a member of any group. There are awards for activators of summits, hams that climb, and for those operating from their homes, the chasers. This means it is not only for mountaineers but rather for radio amateurs worldwide. Hundreds of countries are participating, with each one having its own association. Each association decides on the summits that should be recognized by SOTA within its own area. Even a local hilltop, e.g., 984 feet high, might be considered a summit. A fantastic list of all the international summits, including all those in the USA, can be found at <http://www.sota.org.uk/Associations>. We

can click on our callsign area and then the state of interest and see what qualifies in that locale. The scoring for both the activators and chasers is based on the height of the summit worked or activated. Various scores notably earn different award certificates. The ultimate awards are the *Mountain Goat* and *Shack Sloth* trophies. The SOTA online database is where we find the Honor Roll for both Activators and Chasers. To learn more, go to <http://www.sota.org.uk/>.

### ***Worked Antarctic Callsigns Award***

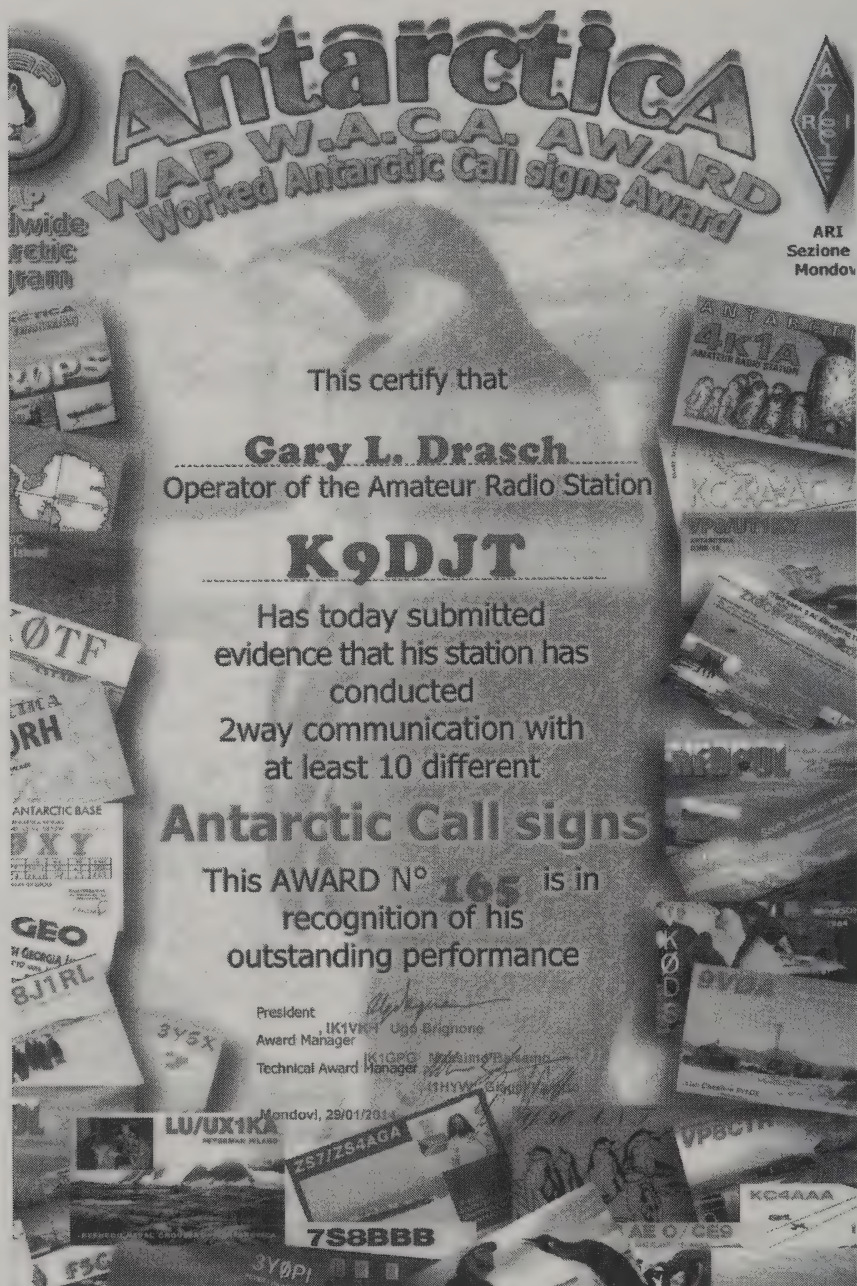
It all started after reading the book *Endurance*, an Antarctica expedition led by Ernest Shackleton. For whatever reason, Antarctica has always fascinated me. They do have Internet and TV via satellite, but nevertheless, ham radio continues to be popular with the various countries doing research there. All of their ham radio activity is the very reason for the Antarctica awards program.

WAP<sup>64</sup> (Worldwide Antarctic Program) was founded in 1979 and is dedicated to ham radio Antarctic chasers. Note their website at <http://www.waponline.it/>. When looking at the WAP awards, the Worldwide Antarctic Awards Gallery, you will find awards available from Argentina, Australia, Italy, Russia, Ukraine, and Poland. Additionally, there are awards for sub-arctic areas and even a Polar Ship Award. I am proud to be a recipient of the WACA (Worked Antarctic Callsigns Award) by submitting proof of working at least 10 different callsigns in Antarctica. Since receiving the award, I have worked and confirmed an additional eight. I find it alluring—actually magical—to be able to communicate with a person antenna-to-antenna, to the opposite end of the globe. Although many arctic operators use LoTW, I always exchange QSL cards with them.

### ***VHF/UHF Century Club***

Are you ready to hunt some *grid squares* on 6-meters and above? My past VHF experience amounted to the homebrewing of a 6-meter, crystal controlled, AM transmitter to talk with friends in the





*Worked Antarctic Callsigns Award (G. Drasch photo)*



local club, and that was it. At the time, grid squares did not exist. Grid squares are a part of the *Maidenhead Locator System*<sup>65</sup> describing our general location anywhere on earth. The name came about after a European VHF meeting in 1980, which was held in a town outside of London called Maidenhead. This system was definitely a new one to me!

Grid squares are useful on all bands, especially when working a *maritime mobile* (boat/ship) in the middle of some ocean. If a maritime mobile station provides their grid square, we are able to locate the ships approximate location on the ocean. A grid square is 1° latitude by 2° longitude and measures approximately 70 x 100 miles in the continental United States. It has two letters, which is the *degree-field*, and two numbers, called the *degree-square*. For example, my home QTH grid square is EN63, and my cabin's is EN55. To obtain better resolution, there are *sub-squares* assigned. A sub-square is 5 minutes longitude by 2.5 minutes latitude, which equates to 5 x 2.5 miles. In my case, they are bj and sn respectively. Therefore, they are written as EN65bj and EN55sn.

The *VUCC* award was created in January 1983<sup>66</sup> by the ARRL. It can be obtained by those operators that have worked 100 different grid squares on 50-MHz, 144-MHz, 220-MHz, 432-MHz and above combined. Satellite contacts also count. You will find 6-meters to be an absolute blast when it's open during the summer. I have worked my 100+ grid squares and a few Caribbean entities, but that is nothing compared to Ken, W9GA, who I spoke of earlier. Besides being into EME, he is an avid VHF DX-er. Ken has an addiction to VHF. He is also a terrific tester who primarily focuses on VHF contests. Thus far, Ken has confirmed 136 entities on 6-meters, 34 on 2-meters, and a total of 712 grid squares. That has always impressed me.

### ***Worked all Counties - USA***

I was proud to have received my first WAS certificate at age 14 in November of 1962. I managed to do it again in each of the three

modes during my retirement. But compare that to working *ALL counties*, that is right, COUNTIES! There is 3077 of them in the United States.

The award was originally offered in the early 1960s<sup>67</sup> but was first realized and awarded to K9EAB (SK) August 15, 1965.<sup>68</sup> To date, 1260 operators have captured it, with WA4WKL being the latest recipient on June 20, 2017. That is incredible. The program is one of many run by *CQ Magazine*. The official rules can be found at [http://www.cq-amateur-radio.com/cq\\_awards/cq\\_usa\\_ca\\_awards/cq\\_usa\\_ca\\_awards.html](http://www.cq-amateur-radio.com/cq_awards/cq_usa_ca_awards/cq_usa_ca_awards.html). There are seven classes of awards offered: USA-500, -1000, -1500, -2000, -2500, -3000 and the Pinnacle USA-3077. There are several County Hunter nets; one of the more popular is on 14.336 MHz. They even have their own “spotting” network at [ch.w6rk.com](http://ch.w6rk.com). It’s not only a program for those that live in the United States. I have often met European operators on the air, working towards this award too.

Go ahead; tell me why you’re bored!

## *Chapter 9*

# From Shack Heaters to Now

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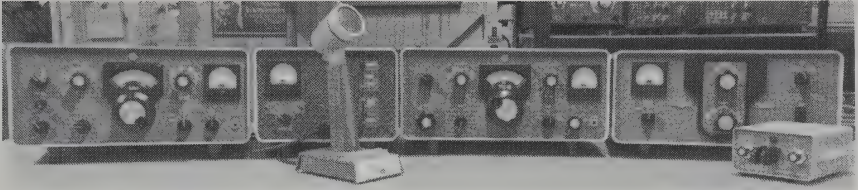
For some hams, collecting and refurbishing boat-anchors is as much of the hobby as it is getting on the air. I recall the rigs from the mid-1950s and 60s such as Collins, R.L. Drake, Hallicrafters, Heathkit, National, Hammarlund, E.F. Johnson, Eico, Knight-kit, Globe and RME; many have survived and are around in a ham's shack or basement somewhere. It is common to hear many of them on 40, 75, and 160-meter nets. If you were to participate in Straight Key Night on New Year's Eve, or join in with the Straight Key Century Club, you will discover that you are listening to some of the old DX-40s and Globe Chiefs, and being told the receiver is an SX-100 or NC-88. It was in the mid-1960s<sup>(73)</sup> when SSB transceivers, namely the Collins KWM-2, Hallicrafters SR-150, and Heathkit SB-100 transformed and simplified the well acknowledged amateur radio stations of yesterday. These new radios combined the receiver and transmitter into one package, sharing the same on-off switch, tuning knob, power supply and many other common circuits between the two. Part of the reason AM was replaced by SSB was due to these sleek transceivers. It was not long until Swan Engineering recognized what was going on in the market and decided to get in on this SSB transceiver revolution. They introduced the Swan-350 and -500 around 1965, which perhaps became the best-selling radios during that time. This was a completely new market! Kenwood, known as Trio Kenwood, opened an office in the United States right about this time. Yaesu, which was founded as Yaesu Musen, also arrived in 1965.<sup>69</sup> Although the first Kenwood and Yaesu radios were all tube, they both became stiff competition for the old pillars, in particular, Collins, Hallicrafters, and Drake. Around 1963,<sup>70</sup> an American company by the name of Sideband Engineers (SBE) was the first to

introduce a hybrid transceiver; the SB-33, that was completely solid-state except for three tubes in the power amplifier. Later, SBE came to be known as Robyn Manufacturing. Shortly after all this, the Japanese manufacturers followed suit and started importing hybrid transceivers while the rest of the real competition in the United States persevered in manufacturing 100% tube *shack warmers*. The Japanese became the dominant player in 1979,<sup>71</sup> which happened to be the same year Icom entered the scene. Ultimately, by 1984<sup>(73)</sup> the stateside manufacturers decided to leave our beloved market place, while several continued with their commercial business.

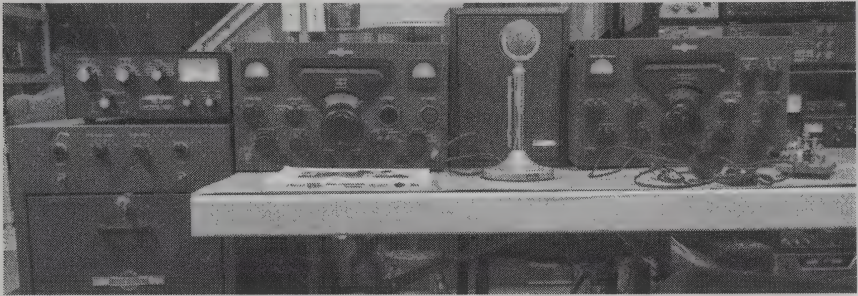
I uncovered an interesting and ironic tidbit on the Icom website during my research. It was about an interview *CQ Magazine* had conducted with the founder of Icom, Mr. Inoue. The meeting took place in 2001 and the writer was Sam Vigil, WA6NGH; the title: *CQ Interviews*;<sup>72</sup> "Mr. ICOM" – Tokuzo Inoue, JA3FA. I could not help but smile after reading the following excerpt of the interview: Mr. Inoue's business philosophy, from the very start of his company, has always been "Technology first, the money will follow." He was greatly influenced in this philosophy by meeting the late Arthur Collins (of Collins Radio), who gave him this advice: "No matter what, keep perfecting your technology. If you perfect your technology and make good products, you will always get business. Forget about unnecessary things and strive to exist by your technology." So, what do you think? Although it was fantastic advice, I wonder if Arthur had ever looked back and kicked himself saying, "Why did I ever tell him that?"

I have always admired Collins equipment, from styling to the military grade construction. My friend Bill, W9MXQ, refers to Collins as having a *desk presence*. I had an opportunity to use a Collins KWM-2A at Field Day in 1964 and at the time was thinking of how much I wanted one. I always felt that way about their S-Line as well. I have told friends, "Now that I can afford it, I am not interested in

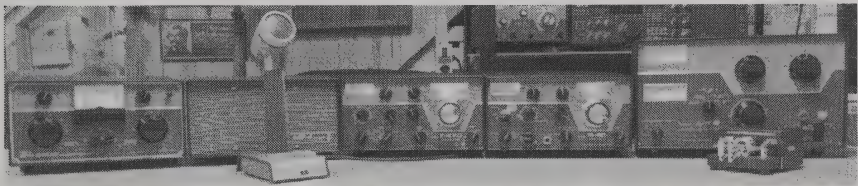




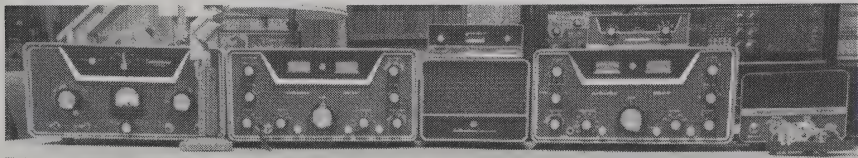
*Collins S-Line, 3-Series station (W9MXQ, W. Shadid photo)*



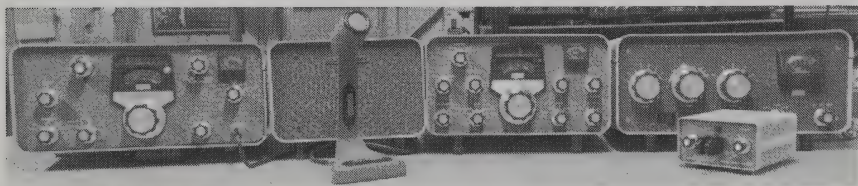
*Collins Gold Dust Twin station. (W9MXQ, W. Shadid photo)*



*Drake C-Line Station. (W9MXQ, W. Shadid photo)*



*Hallicrafters SX-117, HT-44, HT-45 Station. (W9MXQ, W. Shadid photo)*



*Heathkit SB-303, SB-401 Station. (W9MXQ, W. Shadid photo)*

owning them.” On the other hand, I am not going to completely rule it out. Without question, I go along having fond memories of the Gold Dust Twins from when I was twelve years old and spoke into a microphone for the very first time (at the shack of my grandfathers neighbor). At present, the only vintage gear I have is my Grimmer-Wilson straight key and Champion Vibroplex bug, and wishing I had held onto my HQ-170C receiver, Viking Valiant transmitter, and Astatic D104 microphone.

Recently, I asked my friend Bill, AC9JV, what drew him into vintage gear. Bill is an EE (Electrical Engineer), about sixty-two years old, who entered ham radio about three years ago. He said, “It’s just cool, and it’s something you can still work on.” Bill is also one of those new hams learning the Morse code. Thus far, he has acquired a Hallicrafters HT-37, SX-111 with matching speaker, Drake L-4B and L7 linear amplifiers, MN-2000 antenna tuner and TR4 Transceiver. At present, his latest project on the bench is a Hallicrafters SX-96 receiver. Restoring old radios is not any different from what gear-heads are doing with vintage cars. One of the commonalities between old cars and old radios is, as Bill already said, “you can still work on them!” If you want to take a ride down memory lane, find the *QST* article, Washington Island’s Ham Radio Treasure, by Fred Lloyd, AA7BQ. It is in the Vintage Radio column of K2TQN on page 98 of the December 2011 issue. The subject is George Ulm, W9EVT, and his collection located on Washington Island in Wisconsin. I had the pleasure of having dinner and conversation with George at a W9DXCC banquet a few years ago. What an interesting fellow. Check out Georges QRZ.com page at <https://www.qrz.com/db/w9evt>. As with the article about George, there is enough interest going on with vintage gear that *QST* continues to carve out space for a column every month. With a little digging, you will find regularly scheduled nets discussing vintage gear. Check out the ARRL net directory or the AC6V.com website and do a net search at <http://www.ac6v.com/nets.htm#BA>. You will find nets covering Collins, Drake, Hallicrafters, Swan, Heathkit and

more. Another interesting and useful link relating to all rigs is: <http://rigreference.com/en>.

What do you do if you have a boat-anchor and it has not been turned on for years, more likely many years? My suggestion is to wait for a moment. Unless you bring the line voltage up slowly, there is a good chance the electrolytic capacitors will fail causing you an unnecessary mess to clean up. (***WARNING! You are dealing with LETHAL VOLTAGES! Do NOT attempt to work on the radio unless you have experience in doing so.***) If you are comfortable in opening the radio up, make a visual inspection of its interior, especially around the power supply area and look for any leaky electrolytic capacitors. Assuming they look okay, what you want to do next is to find yourself an autotransformer, known well under the brand name of Variac. This is where it is nice to belong to a local club. I am certain you can find a member who owns one and is willing to give you a hand in learning how to use it. Having secured one, determine the power rating of your radio while receiving. If it is a standalone transmitter, determine the power consumption while it is in the idle mode, and ensure the autotransformer can safely handle it. (***WARNING! Fire hazard—Do not leave your test area unattended while doing the following.***) Part of the testing process is to monitor the AC current being drawn while slowly increasing the voltage applied to the radio under-test. Insert an appliance ammeter between the 120VAC outlet and the device being monitored, in this case the autotransformer. An alternative is to place a multimeter (setup for AC current), in series between the AC outlet and autotransformer. Now, before plugging the rig into the Variac, set it to zero, and then plug the radio into it and turn it on. Proceed by gradually turning the autotransformer up to 25VAC and check to see how much current is being drawn. Is it high? Is it close to what should be drawn when operational or higher? If it is high, shut the test down. You likely have a shorted capacitor. If the current is low, let the radio cook for seven hours. (Depending on the amount of dust that is in the radio, you might experience a “hot” smell from the tubes heating up.) Now turn it up to 50VAC



and again, check the current and if reasonably low, let it cook for another seven hours. As you have probably guessed, you are going to do this at 75VAC, then 100VAC, and then finally plugging the radio into a 120VAC outlet. Congratulations! I hope you did not experience any bad smell, smoke, or arcing, and that you are hearing noise coming from the speaker. Although it is up and running, you still want to consider replacing those capacitors in the power supply, knowing it is worth the time and money.

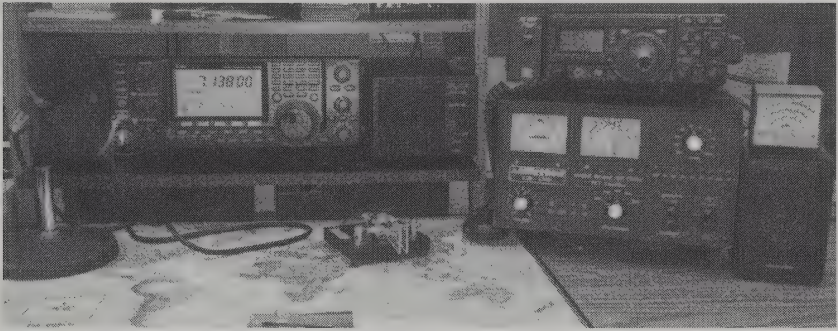
While you were poking around the club looking for that autotransformer, you may have come across a few of those chaps that I described earlier as being more interested in restoring old boat-anchors than operating. I have a friend who fits that mold. As he, many work on only their gear simply for the fun of it. But then there are those that are happy to help a fellow ham by doing a complete refurbishment of his radio; testing and replacing defective tubes, doing a complete alignment and a good cleaning. I have met perfectionists that have gone as far as to search out original paint to redo cabinets. Some of them might only want to be reimbursed for the parts they replace, while there are those that charge for their expertise. If you were to decide to pay for a refurbishment, I would lean towards finding a ham-technician who exclusively services the brand radio you have. I know for sure, there are specialists that only work on Collins or Drake, but it varies as far as other brands go. They are out there but you'll need to find them. This is where Google becomes your friend.

Well, so much for the boat-anchors and memories past. What are hams using today? What happened after the dust settled in 1984?<sup>73</sup> As expected, solid-state HF transceivers and SSB became the new norm; all tube and hybrid architecture faded away. The new transceivers no longer have tunable pi-output networks but rather a *no-tune* 50-ohm output. It was not that long before 500-watt solid-state *auto-tune* HF amplifiers were introduced by Yaesu, Kenwood, and Ten-Tec. Since then, 1500-watt solid-state amplifiers have appeared in the market place. HF Mobile transceivers became





*Some of the latest technology with a little of the old. (W9RN, N. Amidzich)*



*Solid state XCVRS and amplifier. (W9MXQ, W. Shadid photo)*



*Dual receiver XCVR without a panadapter. (W9MXQ, W. Shadid photo)*

compact, and remote antenna tuners started to arise. Direct Digital Synthesis (DDS) became available in ham gear, which gave us improved receiver dynamic performance and transmitter spectral purity. More importantly, it allowed synthesis lock when operating split and provided a quicker CW and QSK action (CW break-in). At the same rate, continuous frequency coverage emerged due to up-converting architecture. Because the WARC bands arrived during this period, all manufacturers started offering new HF models, with many offering upgrades to existing products. As DDS was a spinoff from the military, so became Digital Signal Processing (DSP). Audio DSP filters, heuristic noise reduction and suppression of unwanted tones all became part of a new operating scheme for us. I revealed the impact the PC has had in the way we operate in earlier chapters. That came about somewhere between 1985 and 1995 and is when additional DSP techniques started to show up in transceivers. It was the Collins 75A-4 of 1955 and the Drake 1A in 1957 that originally brought us bandpass and notch filtering along with IF shifting that some refer to as “Passband Tuning,” but when the new transceivers had integrated IF-level DSP, those features truly stood out. An operator owning one of these new radios could now easily adjust the IF bandwidth and shape factors at the turn of a knob. We should throw some digital noise reduction in there too. Moreover, all these functions are done within the AGC loop. Many of the radios available today may have a spectrum scope (panadapter) incorporated or at least an output to accommodate one. No different than our personal computers and smartphones, software has become an important part of our new radio. It is common to find regular software updates for a radio on a manufacturer’s website. Because of the fixed 50-ohm output of the transmitter, many manufactures added an automatic antenna tuner to their radio, or made it available as an option. At the press of a *tune-button*, the internal tuner will do a scan of your antenna system and match your transmitter to it. Although it is an antenna tuner, your expectations should not go beyond handling a mismatch of anymore than 3:1. That should be adequate to handle countless antenna systems, but not necessarily all. Any amateur using

balanced-line, or who wants to match an exotic antenna, needs to purchase an external tuner. The other thing with later model radios is that many do NOT have a built in power supply. Having gone completely solid-state has allowed manufacturers to build radios that operate on 12VDC. A large number of 100-watt HF transceivers can essentially operate as mobile stations (certainly, there are variants among the brands). I personally prefer this configuration for a few reasons. First, the radio is lighter and easier to maneuver. Second, it makes it less costly to ship if the transceiver needs to be sent in for service. And lastly, the bulk of problems that occur in electronics, are usually in the power supply and not the item being powered. By using a separate supply, not only allows us to own an overrated one for everyday use, but an extra one in case it fails. There are many good power supplies available in the market. Any capable of handling 25-amps or more should be fine for a 100-watt transceiver. The real upside to all this, is that radio manufacturers are putting their time and resources in designing better radios and not wasting them on power supplies.

I am not going to attempt to explain differences between the various brand radios, their functions, features, and benefits. You need to do that on your own. After all, that is part of the fun! You will find many first-class radios available from a variety of manufacturers. What we have going for ourselves today are the websites that render product reviews. One of the sites I enjoy using is <http://www.eham.net/reviews/> (while there, you might want to check out their home page as well). The ARRL publishes their own product reviews in *QST* every month that is searchable by members on their website. The only advice I am going to give to those who are buying a radio is, "Do not buy your first one as being the last one." Many buyers go to spread sheets and do comparisons of the brands and models trying to find that perfect rig that will last forever. Don't do it! I would first get involved with a club and see what other OM's or YL's (young ladies) are using. Look at QRZ.com pages and see what others have in their shacks. Go to some hamfests and conventions where equipment is on display. What rig



looks fun to operate? By all means, looks are part of it. It is no different than buying a car. Do you see yourself sitting in front of it and having fun operating? My suggestion is to purchase a name brand, at the bottom or middle of the road in price, and get back on the air. If you are newly licensed, do the same and get on the air. Learn how to use that radio and make mental notes of what you like, what you wish it had, or what you hate about it. This is the radio, which you are going to use to set a baseline, or reference, in order to step up to your next or final radio. Personally, I had purchased three different radios prior to landing on that perfect one. Each one was a little bit bigger than the prior and provided me with a few more benefits. I bought each one used except for the final one. The thing is, I was never dissatisfied with any of the earlier purchases. I continued upgrading only because I wanted to do more. In addition, it was not as if I was stuck with them. Between eBay and other ham radio websites, it is simple to buy and sell equipment today. My final purchase has been my best purchase and I am still satisfied with it. I knew what I was looking for because of what I used in the past; my reference. I do look at new technology when it arrives, but thus far have not found any new hardware that has tripped my trigger. The radio you choose continues to be dependent on what you enjoy doing in the hobby and obviously the size of your wallet.

The three big names and new mainstays in HF transceivers are Icom, Kenwood, and Yaesu. They all make fine equipment ranging from lower price products, \$550 to \$700, to the higher end of \$7000 to \$12,500, and everything in between. Go to *QST* and *CQ Magazine* and you will find a few other brands, especially in the VHF-UHF FM arena. Additionally, do not forget to checkout eBay, Craigslist, QRZ.com and QTH.com for used equipment. Many good deals turn up when other operators are upgrading to bigger and better. I personally purchased those first three radios of mine, a Yaesu FT-450AT, FT-950 and FT-2000 used and never experienced any problems. The same goes for accessories: speakers, headphones, power supplies, antenna tuners, rotors, and keys.



If you are returning from the “buy USA,” boat-anchor generation, as I had, you will appreciate this. You have heard the saying, “What goes around comes around,” right? Well, unbelievably, the United States is making a huge comeback in the amateur radio market. There are two American brands, Elecraft and FlexRadio Systems, which are both leading the pack in new technology. As expected, it is neck-and-neck when it comes to the “specsmanship.” It reminds me of the old audiophile days where there was a proven difference, but no one could hear it. Along with them are two other well-known American companies: Alpha RF Systems and TEN-TEC; both have had their share of bumps in the road, nevertheless they come across as doing reasonably well.

*Software Defined Radio* (SDR) is the latest in technology, and FlexRadio Systems happens to be one of the manufacturers that falls into that category. Recently, other SDR brands have been appearing on the horizon. They are Apache Labs, Odyssey TRX, and Expert Electronics, all made outside of the United States. Literally, the majority of these radios have no controls on the front panel except for an on-off switch, plus jacks for the microphone, key, and headphones. The rear panel looks akin to any other radio, having a full complement of jacks, ports, power, and antenna connectors. The interface to the radio is a PC monitor, keyboard, and mouse. If you are comfortable with, and enjoy using, slider controls and buttons on a screen to control devices, an SDR is for you. Recently, in an attempt to lure knob turners such as myself, FlexRadio Systems developed an interface named *Maestro*®, whose face panel resembles a typical transceiver. The difference being, is that it is not physically attached to the radio. It is connected to the radio chassis-box via Wi-Fi or a network-cable connection. The radio can be in one room while the control panel can be anywhere Internet access is available. More recently yet, FlexRadio Systems created a new package using the *Maestro*® front panel and a cabinet enclosing the radio and connecting cables. This particular model certainty

resembles a typical transceiver, as does the Expert brand. All the SDRs make for operating remotely quite effortless.

It is human nature for us to want the latest and greatest in technology. Just because a radio might offer it, is not necessarily the best reason to purchase it though. What normally comes with that greatness is a bigger price tag! There is a variety of incredible products available, but the price can get up there once they are fully configured. Again, decide what you want to do with your radio. If DXing or contesting sucked you in while using your first radio, that baseline, you will likely head into the direction of the latest and greatest. However, if you were drawn into rag chewing and you are happy making QSOs regionally, do not waste your money. You might want to stick with that first or second radio you bought. The same goes for your antenna system. Because this is a hobby, you are allowed to spend as little, or as much, as you want on it. The main thing is that you have fun and ENJOY it!

## *Chapter 10*

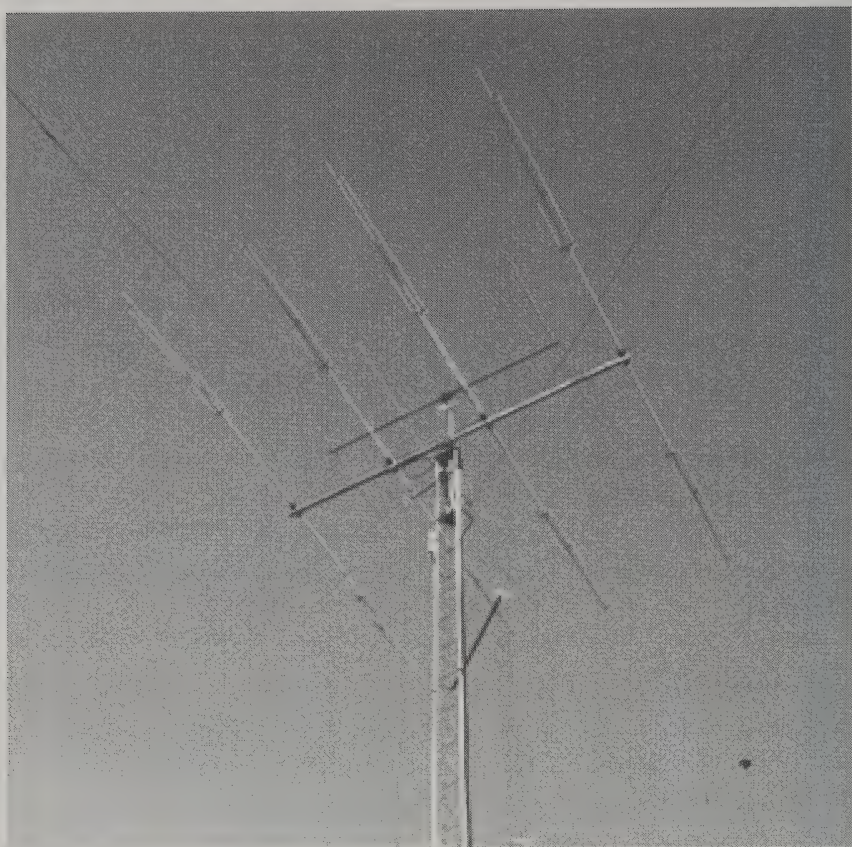
# Antenna, antenna, antenna

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There is nothing better than the smell of fresh aluminum in the morning. Undeniably, my XYL disagrees. You will find many more manufacturers of all sorts of antennas compared to the earlier years. The old HF mainstays such as Mosley, Hy-Gain, and Cushcraft have endured, but today they have competition from M2, Force 12, GAP, SteppIR, OptiBeam, Cubex, Acom, ECO, JK, DX Engineering and more. Along with those, VHF/UHF mobile and base station antennas far outnumber the HF antenna manufacturers. There are bunches out there.

The market that surprises me is manufactured or preassembled wire antennas. I remain in disbelief—really—preassembled wire antennas? The answer is yes. Companies such as Alpha Delta, Array Solutions, Buckmaster, B&W, Buxcomm, MFJ, Radio Works and more, make and market dipoles, Carolina-Window's, fan dipoles, loop, and end-fed antennas. All cut to length with a balun (balanced-to-unbalanced device), coax connector, and insulators all appropriately attached. To my amazement, they are being sold like crazy. I've even heard users in QSOs talk about the brand name dipole or end-fed antenna they are using (as if there is actually a difference). Better yet, these wire antennas are written up in product reviews. Come on—they are joking—right? Are hams no longer able to buy some wire, insulators, and make their own anymore?

I love building and experimenting with antennas, from wire to some of the simpler beams and verticals. Antennas are another one of those disciplines of a hobby within a hobby. The resources available these days compared to the 1960-70s are unbelievable. There is so



*My KT-34A Tri-bander at 38' and 6m homebrew at 46'. The tower is also gamma-matched on 160 meters. (G. Drasch photo)*

much to learn and experiment with when it comes to antennas. Pick up a copy of the *ARRL Antenna Handbook* if you do not believe me. By doing so, you will be pleasantly surprised to find an accompanying CD containing an assortment of programs to assist you in antenna design and transmission line calculations. As far as building materials go, there is a distributor in Ohio by the name of DX Engineering. Besides being what I refer to as a traditional ham radio distributor, they have all the materials we need to build any type of antenna we want. They are able to supply us with various size tubing, clamps, hard to find stainless steel hardware, cabling, connectors, towers, masts and more. They even provide some of



their own antenna design software on their website. One of the primary things about the company is that they listen to the customer. There is not much of that going on anymore.

You need to peruse the assortment of programs on the CD that accompanies the *ARRL Antenna Handbook*. One of them is a demo copy of EZNEC, which is a tool I simply find mind-blowing. EZNEC is an antenna-modeling program. It permits enthusiasts to model an antenna, from a dipole, loop, vertical or beam right on their own computer. They enter the data such as element (tube or wire) length, diameter, spacing, and height above ground, loading coils and traps, even the type of soil. Any parameter that affects the performance of an antenna can be entered. The program is not very intuitive and therefore it makes sense to pick up a copy of *Antenna Modeling for Beginners* by Ward Silver, NOAX, an ARRL publication. Ward systematically takes the reader into the modeling of their first antenna. It might come across as a little laborious to the user until they become comfortable with it. Once they do, it will provide them with both azimuth and elevation radiation patterns along with the DB gain, the complex impedance, and Standing Wave Ratio (SWR) and more. They may ask “what if” questions. How does it perform over a real ground compared to Free Space? Is it worth raising the antenna ten or twenty feet? Does running the wire on an angle make a difference?

I find the program simply amazing, and need to say it in fact works. Example being; I acquired nearly all of the pieces of a four-element 6-meter beam from a friend a while back. I took it home, cleaned it up, and reassembled to what I thought was correct. I was not exactly sure what brand it was, but it looked similar to a Hy-gain VB-64DX. I found a manual for one online and downloaded it. To work on it, I placed it into some homebrew holders fastened to a pair of old sawbucks. The anticipation of having a 6-meter beam was starting to fire me up. I connected my MFJ-259B antenna analyzer to the relic and found my excitement quickly dashed. The impedance was high and I had a 3:1 SWR. I kept dinking with the

coaxial matching loop thinking it had to be the problem. That wasn't it. It was a head scratcher. Here I had built it as close to the specs in the Hy-gain manual and the darn thing was not working. As so often, I brought the subject up to Lyle over pizza one night. He asked me, "Did you model it?" My response was, "no," of course. The next morning, I began entering all the data, i.e., the real measurements taken directly off the beam—not from the manual. When done, I ran the EZNEC program and lo and behold the results matched my antenna analyzer to a T. They were identical, same impedance and SWR. I was elated! This exercise did not only give me faith in my analyzer but also the software. So, how was the construction different from the drawing and measurements I was using? During the measurement process, I did happen to notice the diameter of the driven element was at least twice, if not more, the diameter of the driven element specified in the Hy-gain manual. The element to boom connection was a Cushcraft design using those large black insulating sleeves, slid over the driven element and then clamped between special element-to-boom connectors. I thought, "Could that be it, the element diameter?" It surely was. The EZNEC program proved it. I was grinning ear-to-ear, and immediately started remodeling the antenna using the same size diameter elements but instead; I adjusted their length within the model. There it was; an antenna model with new element dimensions that should work. The program model showed 50-ohm impedance with a 1.1 SWR across the portion of the 6-meter band I was looking for. It was time to replicate the program measurements to the actual beam. I needed to find some tubing that fit inside the existing elements to lengthen each one a little bit. After making the physical adjustments, my antenna analyzer now read 50-ohms with a 1.1 SWR. It was another case where the PC and program enhanced the hobby. This stuff actually works!

The ARRL did a good job creating the *Antenna Handbook*. The accompanying EZNEC program, and ARRL YW (Yagis for Windows) software, can make use of various antenna models straight out of



*20 Meter, 3 Stack, 6 Element, OWA Yagi (K9CT, C. Thompson photo)*

the chapters of the book. The demo version of EZNEC makes use of up to 500, of what is referred to as segments, for an antenna design. In short, the more segments, the better the accuracy of the model. Although it allows us to design and modify using 500-segments, the downside is that it only allows us to *save* designs

having 20-segments or less. In order to save a complex model, we need to step up to a paid copy. There are two versions of EZNEC available. They are the full blown, 500-segment version, selling for \$99, and then there is the “Plus” version, 2000-segments, available at \$149. You may learn more, and order, at <http://eznec.com/>.

Do you remember the old saying, *antenna, antenna, antenna*? Nothing has changed much in that respect. One’s antenna system continues to be the crucial building block pertaining to the performance of any station, may it be transmit or receive. We can own a small affordable low power QRP station connected to a high-performance antenna system and do quite well. As an example, I was testing an antenna switching system I had built, and found an unused frequency on 20-meters and turned my power down to ten watts. I only wanted to take a quick look at my SWR without necessarily making a contact. I identified myself and said, “test, test, this is K9DJT,” and let go of the PTT (push-to-talk) floor switch. So, what happened besides my SWR being fine? Some bucko comes back to me and says, “You’re five-by-nine in Florida.” I’m thinking, this is unbelievable, I am only running 10 watts. I had not given any thought of being connected to a four-element tri-bander pointed in his direction. Clearly, band conditions played into it too, but never the less, 10 watts SSB? Not only was I using a beam at 38 feet, I was using 7/8” Heliac transmission line to feed it. Part of me says the transmission line played a role in it as well. That particular coax at 14.2-MHz has less than .16-db loss per 100-feet, which means when using the Heliac; it is almost as if my radio is right at the antenna. I experienced a similar QSO with a gentleman in Texas early one evening on 6-meters. He said my signal was booming. I was running 100 watts into my 4-element beam at 46 feet pointed at him. (I was using the same 7/8” Heliac cable as on 20-meters.) He and I decided to conduct a little experiment with me gradually decreasing my power. Long story short, I descended to 1 watt and I retained my 59 signal with him. It was really a very memorable QSO and experience.

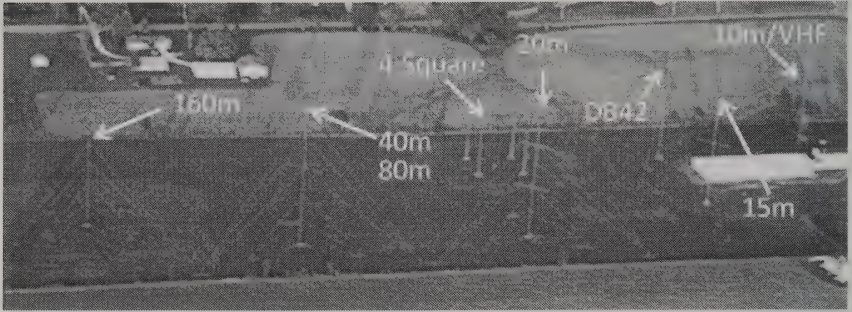


The moral of that story is to create an antenna system as efficient as possible. That means a resonant antenna along with a low loss transmission line. An antenna is only resonant at one frequency, so we want to tune it that it falls somewhere in the middle of our frequency-range of interest. If our SWR is higher towards the ends of our selected range, or we are using a balanced transmission line, we want to use an antenna tuner to match it to our transmitter.

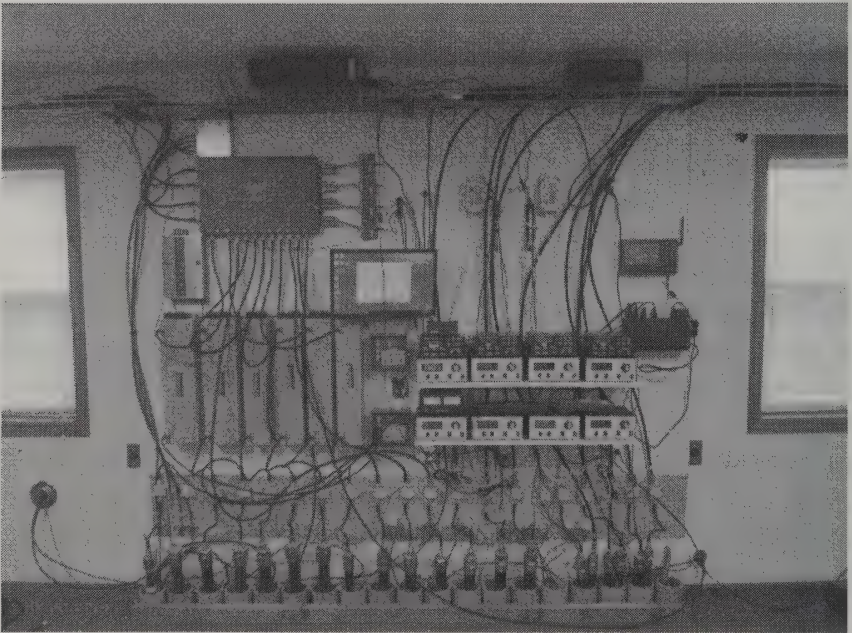
Speaking about antenna tuners—somewhere along the line you have likely heard an operator say, “I have an antenna tuner that will tune a wet noodle.” That is marvelous, but it does not mean he has an effective system. All the tuner is doing, besides keeping your transmitter happy, is ensuring all the power is going to a wet noodle; it does not mean it is being radiated. Many refer to this as a conjugate match. It is when a tuner matches the complex impedance of whatever you are attempting to use as an antenna to 50 ohms. The whatever might be a random length of wire, a light bulb, or even a dummy load. They will all work, all of them will radiate energy. But the thing is, they are not very capable antennas. That low SWR between your antenna tuner and transmitter doesn’t mean you have a perfect antenna system. A low loss transmission line and a resonant antenna brings it closer to a reality. Understanding a resonant antenna is one thing compared to understanding transmission lines and SWR. One of the best articles that helped me understand SWR, was written by Darrin Walrven, K5DVW, titled “*Understanding SWR by Example*,” published in the November 2006, *QST*. It is a must read.

An efficient antenna does not necessarily need to be expensive. My original antenna was a dipole, which by the way, I designed and built myself. I strung it between a utility pole in my back yard and the light pole across the street, and supported it in the middle with some PVC pipe. It worked fine. I have several friends that have similar antennas and have not gone any larger. The antenna is fulfilling their needs. They primarily check into regional nets and rag chew around the country, even making occasional DX contacts here

and there. In a couple of cases, they are limited in what they can put up in their neighborhood. Some radio amateurs have gone as far as to create a stealth antenna, using small gauge wire in order to camouflage it. Others have kicked it up a notch. Look around your



*K9CT Antenna Farm-Yes those are individual towers. (WO9W, W. Cusack photo)*



*K9CT antenna switching and rotor controls.(K9CT, C. Thompson photo)*

neighborhood—that flagpole down the street might actually be a vertical antenna. Antenna interests change depending on what hooked us in the hobby. I evolved from being happy making a few QSO's to obsessively chasing DX. So obsessively, the simple dipole I had been using mushroomed into a mini antenna farm on a city lot. Even with that, it doesn't need to be ultra expensive. For example, I have three towers on my property, with two rotors, a tri-bander, a 12/17-meter beam, a 70-cm, a 2-meter, a 6-meter beam, and various wires. My wire antennas are all supported between the towers and the same light pole across the street.

Would a Rohn 25G tower be of interest to you? There is a supply of it out there just for the asking and removal of it. People are no longer using the old residential TV towers because of the advent of cable and satellite TV. I acquired all my towers by offering to take them down for families. I even have a fourth which is ready to take to my cabin. Overall, people are pleased as punch to have it taken down and be gone without needing to pay for the removal. My tri-bander and both rotors, I purchased used. Other than the 12/17-meter beam that I homebrewed, I was given the 2-meter and 70-centimeter by the wife of an SK, again, for taking them down.

Okay, the above is all-fine and good for an old codger such as me, who likes to climb and is willing to disassemble and reinstall towers and antennas. What about the OM who dislikes heights nor has the mechanical skills required to take down a free tower? He should hit the Hamfests. It is common to find used, inexpensive tower at the ones held during the summer. As far as the climbing goes, I trust there is a young do-all within a local club, or at least in a club not too far away, who would be willing to earn a little extra cash. As a last resort, a professional climber/installer can be contracted. My friend Lyle continues to climb, but when it came to putting up some used self-supporting cell phone tower, he contracted a professional.

I have paid for used Heliac cable and connectors but that is where it stops. It is another story when it comes to any other type of



transmission line and/or connector. We want to buy the best quality available. A well-known contester in one of my clubs once told me, "A cheap connector is an easy way to wreck a weekend." Without doubt, I did not heed his advice and needed to prove it to myself. All connectors might look the same in those eBay ads, but believe me they are not. The same goes for coax. Always buy a brand name cable and connector. It is worth the extra money in the end.

Were you curious earlier when I spoke of a balun on a dipole? The use of a balun was not prevalent during the 1960s and earlier. We are now using these on the coax of not only dipoles, but also all of our antennas fed with coax. Over time, the communications industry discovered that coax does not have currents flowing only in two directions such as a balanced-line, but rather three; one on the center conductor, another on the inside of the shield, and an additional current flowing on the outside of the shield. Instead of connecting our coax to the center of the dipole and letting it hang, we now add several loops of coax right below the connection. Some of the beam manufacturers started doing this in the mid-1960s to early 1970s. The more popular alternative today is to add a *bead-balun* at the feed point of our antenna. A bead-balun is several ferrite beads slid over the coax at the antenna connection. The main concept of adding a coiled coax or ferrite beads is to eliminate that third current flowing on the outside shield of the transmission line. Imagine the havoc a radiating shield can cause with consumer electronics to problems in our own shack. To learn more and to get the real technical rundown, reference either an *ARRL Handbook* or *Antenna Handbook*. It is well worth the study.

I have a few friends whose opinions are a little skewed as to when and how well to do antenna work. Reasonable hams agree with the idea of working on their antenna system during decent weather or at least before the snow flies. That in effect is the plan for us living in the upper Midwest. The thing is—I still manage to make repairs during the winter. In fact, I once climbed my tower in February a



couple of years ago to replace a sheared off bolt on my rotor (the beam was turning freely all on its own). This year I replaced a connector on a transmission line in 10-degree Fahrenheit temperatures because water made its way through the electrical tape; it froze and broke the PL-259 connector apart. Some of my buddies say, "Winter is the best time to do antenna work!" However, if you ever met any of my buddies, you would understand. Winter antenna work does not particularly thrill me. The cable is stiff, the tools are ice cold, and nothing is ever large enough to work on while wearing gloves. The best is when I drop a tool or a connector in the snow and cannot find it. Then when done, I go inside to warm up and discover little cracks, almost like tiny cuts, on my fingers from the cold. They are usually near a fingernail or on the knuckle, and hurt like hell!

So why do we do it? Repairing the rotor was to enable me to work a rare DXpedition. And I did! The coax connector was to work a contest, which never did come to fruition because I had additional outside problems. I think the real reason is that we need to suffer to make up for our own stupidity. After all, most of our problems are self-inflicted. If I had used a hardened-steel bolt instead of soft, it would not have broke. If I had used a quality electrical tape such as Scotch 33+, rather than some cheap stuff, water would not have gotten into the connector. Better yet, if I had replaced the cable rather than splice it, there would not have been any downtime or problem at all. I get down on myself when things break down and realize it could have been prevented. I'm always trying to improve my workmanship, or at least anticipate what could happen, so I don't need to address antenna issues in the winter. One morning during a QSO with a friend of mine, Ron, W9BCK, I began explaining my professionalism, which I was implementing during the installation of a new antenna. To my surprise, he replied, "no, no, no. You are wasting your time." I did not understand. "What do you mean?" I asked. Ron said, "At some point, you're just going to change things again. Why bother?" You need to know Ron. He is an experienced man who is highly regarded not only by me, but also by

many in our local club. Being in his late eighties at the time and saying what he did broke me up. I could not stop laughing. Here I was, expecting to impress this retired broadcast engineer with my quality workmanship, and he told me I was wasting my time. I replied, "Really?" He came back and said, "Yes, you need to operate as though it is a permanent Field Day. You are always going be changing something." Although I persist in doing things right, something my grandfather taught me, Ron is as good as on the money. I am unable to count how many times I have changed things around with my various installations.

I take tower safety very seriously. I make use of a fall protection harness and follow all the necessary safety precautions except for one. I have a habit of climbing my towers while my wife is gone. She gets upset with me saying, "what if something happened?" I guess I always count on there being a nosey person in the neighborhood who might be watching me and would call 911. I shared my wife's concern with my friend Tom, W9IPR, at a club meeting one night. Tom replied saying, "I always climb my tower while Pat is gone. That way, if I fall, I don't need to listen to her bitch at me!" You know, I think he has something there!



*The antenna farm of OM8A, Slovak Republic (W0GXA, R.C. Lee photo)*

## Chapter 11

# Beyond Lids

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This is a sore spot for the entire ham radio community and me. It is the reason I placed this chapter towards the rear of the book. Fortunately, it is only a few people that fall into this subject matter and spoil it for the majority. If you are unfamiliar with the term *Lid*, it means “poor operator.”

A DX-er refers to an operator who parks on a DX transmit frequency and reprimands others as a *cop*. This is the frequency where the DX station responds to callers who are transmitting on a different frequency up from his. This self-appointed cop sits there, just like a squad car with radar, waiting for “Mr. Non-split” to screw up and call on the DXs frequency—the wrong frequency. He cannot wait to shout at the offender to let him know. Preferably, there would be no cops, but there are a few individuals that look upon themselves as doing the DX-ers a service. As I said, these cops are self-appointed—they are not members of the DXpedition, and they do nothing more than create an annoyance. They naturally show up during all the large and rare DXpeditions, and there is always enough of them to cover all the bands. No one understands what pleasure they get out of it other than feeling superior by knowing where the DX is listening. Unfortunately, they are here to stay. The fact is, every time a cop corrects a wrongdoer, he himself is creating interference for the DX-ers by covering up the very station the non-offenders are trying to copy. There is not a DX-er alive who has not called on the DXs frequency by mistake. A true DX-er knows the DX is listening up, but for an unknown reason forgot to place the radio into split mode. I did it once. I was attempting to work a DX station with my dual receiver radio, listening to the DX in my left ear and the pileup in my right. I knew where I wanted to be transmitting,

and in fact thought I was on the correct frequency—the one above the DX—the one in my right ear. As luck will have it, I forgot to split my transmit VFOs. The result was a reprimand from a cop saying, “Up Stupid.” Hey, I am not stupid; I made a mistake! On the other hand, he might have said, “up...up...up...up!” Think about it. First, my mistake covered up the DX station for two seconds, and then the cop covered the DX for another one to two seconds or more. Between my error and the cop, we may have busted an ATNO of a fellow DX-er. I will say this though; I made that mistake only once. I was truly embarrassed.

In all society, there are good cops and bad cops. What is the difference in ham radio? A good cop only says, “Up!” It’s simple; he makes the point, and uses the least of amount of time. That is the important part, the least amount of time. The corrected operator could be polite and say, “Thank you” to the cop, but that is not being a good operator. A good operator doesn’t waste any more time than he and the cop already have in covering up the frequency. A good operator immediately splits his VFOs and gets on with working the DX. Another thing a good operator does is NOT respond to a cop’s derogatory remark. It doesn’t make any sense to reply to the officer who called me stupid with, “who you calling stupid asshole?” Regrettably, I have heard that done, and then an argument ensues and covers the frequency even longer. If I did that, I would be no better than the cop who called me stupid in the first place. I merely left and disappeared into the pileup.

The thing that irritates me the most is deliberate interference, or *direct QRM* (DQRM). I hear schlups intentionally transmit nonsense on the DXs frequency so others cannot hear him. For example, they will lay a carrier (an uninterrupted CW signal) on the frequency, or maybe send a series of dashes or dots for minutes at a time. They might send a digital signal for long periods. I even heard some fool playing music in the CW portion of the 40-meter band one evening. They do this in order to spoil the fun of others. They consider it funny. This sad behavior is not limited to DXing. I have a friend who



told me of how people have been causing DQRM with nets as well. I am yet in disbelief, and do not have any recollection of comparable behavior going on in the 1960s.

So, how do we handle the situation? I have wanted to give a few jerks a piece of my mine more than a once when I became outraged by their conduct. Instead, I chose to push back from my operating position, took a deep breath, and turned the radio off. It was not worth letting them get to me. I have had several discussions with members of the DX club I belong to, and found it was unanimous; the best way to deal with a QRM-er (a person causing interference) is NOT to respond. What fuels the yo-yo is replying and letting him know he's bothering you. That is exactly what he is looking for. It makes him happy when he knows he's getting under our skin and will rudely continue. He is not having any fun when he discovers he's not causing problems. If we ignore him, he will gradually go away.

During the Centennial Points Challenge, I had made contact with Kay Craigie, N3KN, who was the president of the ARRL at the time. Being president meant extra points for participants working her. Do I need to say more? As you would expect, someone was causing DQRM. Kay was barely readable but I was totally ignoring it. Kay made a comment about the interference and I replied saying, "It's not a problem, that's what notch filters are for" and unbelievably, when I returned it to her, the guy was gone. That is the key. As annoying as it is, do not engage with the individual. Ignore him or switch to a different band. Change things up for yourself, or turn the radio off and come back later.

The day of the week, and the time of the day, seems to be a factor of when DQRM occurs. Being retired allows me to operate whenever I want, which in-turn permitted me to make a surprising observation. DQRM is a worldwide problem, but it appears the DQRM-ers in the United States are the working class, meaning the non-retired. The majority of the DQRM during the week is from late

afternoon to midnight. Sad to say, we can also count on it occurring from late afternoon on Friday to midnight on Sunday. There is next to nothing taking place during the weekday, being non-existent from midnight until late afternoon. It appears the few misguided people causing the DQRM are jobholders by day and QRM-ers by night and weekends.

Then there is *Slim*. One of my favorite and memorable DXpeditions was the Amsterdam DXpedition, FT5ZM, in February of 2014. Band conditions were extraordinary and I was having a ball filling the band-slots. I was working them on all the bands one right after the other. They happened to have an online log they updated regularly and I checked daily. One night when reviewing it, I noticed I was not in their log for my 40-meter CW contact. I'm thinking, how can that be? If I had ever made a solid contact with a DXpedition, this was it—hands down—no question about it. Never the less, I wasn't in the log. I brought this up to Lyle, WE9R, over pizza at our local meeting spot and he started grinning. I said, "What?" He said, "You worked Slim." My response was, "who in the hell is Slim?" He explained that Slim was another one of those misguided souls who pretends to be the DX station. He gets on the exact same frequency, turns his power way down so he is as weak, and tries to match the same code speed of the DX station. I know, it is hard to believe.

So far, I have only managed to work Slim on CW. Does he attempt the same stunt on SSB? No, if he did, all of us would hear him laughing! Slim is a tough one to get around unless we are able to hear the difference in the signal strength between him and the real DX station. He will get on a roll once the pileup starts answering him, and when that happens, many operators will have wasted time chasing a ghost. The worst of it is no one knows until they do not find themselves in the logbook. That is why online logbooks, uploaded by the DXpedition, are so helpful. It gives us a second shot at the DXpedition as long as they haven't packed up. I expect Slim holds down a job similar to the QRM-ers because he isn't around during weekdays either—only at night. I do get upset knowing I had been

drawn into his game. The only way I justify my time in working these space-cadets is by looking at it as a practice in working a pileup. After all, he did find me!

I have heard fellow hams discuss bad behavior and say, "that's what happens when you drop the code requirement," referring to licensing. That's not it. All of the Slims are good CW operators that copy at a high rate of speed. They are not new to the hobby. Reinstating a code test will not fix the Slim problem. As far as the DQRM goes, would a code test fix that? I am not sure. What it comes down to is the behavior of some hams is no different than a very select few in any locality. We are not immune to those that partake in deplorable behavior. So what is the solution? Maybe we just need to wait. As my friend said about his *really bad neighbor*, "She'll eventually die."





## Chapter 12

# Ham Radio Speak

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I expect you are still familiar with much of the slang and abbreviations, even if you've been inactive and are now just returning to the hobby. You may want to skip this chapter, then again, it might be a good review. Maybe there are a few new terms; or you'll say to yourself, "Oh yah, I remember that!" My main goal here is to provide the reader with an idea of how hams communicate not only on the air but also in general.

Along with *slang* expressions come, *abbreviations*, *prosigns*, and *brevity* codes. The difference being, an abbreviation and prosign is a shortened form of a word or procedure, while a brevity code is used in reducing the amount of time it takes to say a sentence. As young people created their own form of language for texting, ham radio operators had done the same, but they did it much sooner, like multiple generations sooner.

The majority of abbreviations, in contrast to slang, are used in ham radio while sending and receiving the Morse code. Railroad telegraphers created a bucketload of abbreviations, which modern code operators continue to embrace and use today. The popular abbreviations are listed in a table below. Keep in mind that the list is only a partial from what is available for use.

Prosigns are referred to as procedural messages that use a special dit-dah sequence. They do not represent any specific word but rather a non-language function relating to the exchange of information while sending and receiving Morse code. The prosign list follows the abbreviations list below.

There are two groups of brevity codes used in ham radio. One is the *Q code*, started in 1909.<sup>74</sup> It is otherwise known, or referred to, as Q-signals. The Q-signal may either be a statement or a question. Sometimes there might be a slight variation of Q-signal usage, which I show in parenthesis in the table below. The second group is the *RST code*, widely use by 1912,<sup>75</sup> and solely referred to as RST. The reason these came about was to create a shorthand for the commercial Morse code operator, later continuing into CW radio communications. Because they were so well known and widely used by CW operators, it was not a surprise that they were carried forward into phone communications. The RST code is a system, which uses numbers in providing a comprehensive signal report to the station that an operator is working. RST stands for *Readability*, *Strength* (signal) and *Tone* (or Quality). The *Quality* is used in place of Tone when operating the digital modes such as PSK or RTTY. Only the readability and signal strength is used when operating phone. Discussions have been taking place regarding the tone portion of the RST report; the question being, is it still of value? During the early years, when transmitters were primarily homebrewed, there was a significant difference in the tone quality of a CW signal. That signal was dependant on the quality of the equipment the operator built. Currently, the chances of coming across a homebrew transmitter and power supply combo are slight. Today, the majority of rigs are commercially manufactured and they all sound good. Unmistakably, there are boat-anchors out there that press on and generate some questionable signals. Only time will tell.

Below is a list of common *Slang*<sup>76</sup> expressions used among radio amateurs on the air, face-to-face, emailing, and texting:

- 807 – old glass vacuum tube several inches tall; Slang for a beer, as, “let’s get a couple of 807’s.”
- Antenna farm – multiple, large antennas, owned by a ham operator.
- ATNO – all time new one.

- Band points – unit of measure used with the DX Challenge Award.
- Barefoot – running a transmitter without an amplifier.
- Beam – a multi-element antenna typically located on a tower.
- Big gun(s) – High powered station(s).
- Bird – amateur radio "satellite."
- Boat-anchor – old, vintage, or classic radio equipment.
- Brick – any group of electronic components encapsulated into a block.
- Bug – semi-automatic Morse code key using a spring action to create dit's (dots).
- Bureau – a clearinghouse, routing system, for QSL cards.
- Cans – headphones.
- Chirp – CW signal with a bird like tone.
- Cloud Warmer – an antenna that radiates straight up.
- CW – continuous wave signal; also meaning Morse code.
- DIT DIT – the sound of two E's in Morse code. Means and sounds like "bye-bye."
- DQRM – deliberate interference.
- DX – distance Stations.
- DX-er – a ham looking for DX.
- DXing – the act of looking for DX stations.
- DXpedition – group of hams that travel to a remote location specifically to activate for others.
- Elmer – mentor and helper to new radio amateurs.
- EmComm – emergency communications
- EME – Earth-Moon-Earth (moonbounce)
- Eyeball – a face-to-face conversation.
- Fist – the unique sending style of a particular Morse code operator.
- Gentlemen's Band – 160 meters (1.8-2.0 MHz).
- Harmonic – children, e.g., I have two harmonics, a boy, and a girl.
- HF – high frequency (1.8 to 30 MHz).

- Hollow state – tube equipment.
- Homebrew – homemade equipment.
- Key, Straight Key – Morse code lever type of device.
- Keyer – electronic circuit, which creates DITs and DAHs depending on which key paddle is depressed.
- Lid – poor operator.
- Little pistol – lower power station
- LoTW – Logbook of The World.
- Machine – a form of an RF repeater.
- Magic Band – 6 meters (50-54 MHz).
- Matchbox – an antenna-tuning device between the transmitter and an antenna.
- OM, Old man – any male ham operator.
- Open – the atmosphere, solar activities, is supporting communications.
- OQRS – an Online QSL Request Service.
- Paddles – an Iambic type of key.
- Phone – voice communications, using a microphone.
- Pileup – many stations all calling a single station at the same time.
- Pirate – an operator using either someone else's, or a made up callsign.
- Pounding brass – operating using Morse code.
- Qs – the number of QSOs (contacts) made during a contest or period of operation.
- QRM-er – person causing intentional (deliberate) interference, DQRM.
- QSLing – the exchange of confirming QSLs (post cards).
- Rag chewing – talking about anything and everything.
- Reading the mail – listening to a QSO/conversation without participating, i.e., without transmitting.
- RF – radio frequency.
- Rig – the radio amateur station; an operator's equipment.
- Rock – a quartz crystal used for the frequency control of a transmitter (primarily used years ago).



- Rock bound – a transmitter, which can only use crystals (a rock).
- Rubber Duck – a.k.a "Rubber-Ducky." A flexible antenna found on walkie-talkies.
- Shack – the room where the radio equipment resides.
- Shout – to call another amateur on the radio.
- Simplex – receiving and transmitting on the same frequency.
- SK, Silent key – refers to a fellow ham that has passed away. His key has gone silent.
- Slim – a CW imposter pretending to be a DX station. A.k.a. pirate.
- Skimmer – an automated CW/RTTY spotting device (cluster).
- Split – transmitting on one frequency while listening on a different one.
- Tailgating – transmitting quickly after the callers transmission.
- Tail-ending – transmitting after the pileup stops calling.
- Ticket – radio amateur license.
- Top band – 160 meters (1.8-2.0 MHz).
- Traffic – information passed between various stations.
- Tri-bander – a three-band beam antenna (10, 15, and 20-meters).
- Wallpaper – awards and certificates.
- Work, worked – make or made contact with. Example: "I worked K9VNM on 17 meters."
- XYL – wife (ex-young lady).
- YL – young lady; any female ham operator.
- Zed – a way of saying the letter "Z" in order to eliminate confusion with the letter "E."
- Zero-beating – matching the transmitter frequency to the receiver frequency.

This is a partial list of the commonly used CW abbreviations:<sup>77</sup>

- 73 – Best Regards.
- 88 – Hugs and Kisses.
- ABT– About.
- AGN – Again.
- ANT – Antenna.
- ARND – Around.
- B4 – Before.
- BK – Break, Back.
- BN – Been.
- BTR – Better.
- BUX – Dollars.
- CLDY – Cloudy.
- CLR – Clear (usually a description of the weather).
- CNTCT – Contact.
- CONDX – Conditions.
- CPY, CPI – Copy.
- CQ – Calling any station who can hear me, I am looking for a conversation with anyone.
- CU – See you.
- CUD – Could.
- CUL – See You Later.
- CUZ – Because.
- DE – From (or this is).
- DR – Dear (often used by foreign/DX operators in front of the other operator's name).
- ES – And.
- FB – Fine Business (OK, good, terrific).
- FER – For.
- FT – Feet.
- GA – Good Afternoon.
- GB – Good Bye.
- GE – Good Evening.
- GL – Good Luck.

- GM – Good Morning.
- GUD – Good.
- HI HI – This is the way a laugh is sent via CW (Morse code).
- HPE – Hope.
- HR – Here, Hear.
- HV – Have.
- HW – How.
- NR – Number.
- NW – Now.
- OM – Old Man.
- OP – Operator.
- PSE – Please.
- PWR – Power.
- R – Are.
- RCVR – Receiver.
- RPT – Report.
- RST (Q) – Code for readability, strength, and tone (quality).
- SIGS – Signals.
- SN – Soon.
- SRI – Sorry.
- TMW – Tomorrow.
- TNX, TKS – Thanks.
- TU – Thank you (Usually sent at the end of a contact; meaning, "Thanks for the contact.").
- TX – Transmit.
- U – You.
- UR – Your, You Are.
- URS – Yours.
- VY – Very.
- WTS – Watts.
- WUD – Would.
- WX – Weather.
- XCVR – Transceiver.
- XMTR – Transmitter.
- XYL – Wife.

- YL – Young Lady.
- YRS – Years.

The following *prosigns*,<sup>78</sup> are used when communicating in Morse code. They use a special DIT-DAH sequence, which are referred to as procedural messages:

- AR – Over, end of message.
- K – Go, any station is invited to transmit.
- KN – Go now, only a specific station to transmit.
- BK – Invitation for the receiving station to transmit.
- R – Received OK.
- AS – Stand by please.
- SK – End of contact.
- EE – Bye bye.

You should find this list as being the common *Q-Signals* used on the air:

- QRG – Will you tell me my exact frequency? Or, your exact frequency is \_\_\_\_\_ kHz.
- QRL – Are you busy? Or, I am busy. (Is this frequency busy or in use?).
- QRM – Is my transmission being interfered with? Or, your transmission is being interfered with.
- QRN – Are you bothered by static? Or, I am bothered by static.
- QRO – Shall I increase power? Or, increase your power.
- QRP – Shall I decrease power? Or, Decrease your power. Also denotes the use of a low power transmitter.
- QRQ – Shall I send faster? Or, please send faster.
- QRS – Shall I send more slowly? Or, please send more slowly.



- QRT – Shall I stop sending? Or, please stop sending. Also means that I am shutting down my station.
- QRV – Are you ready? Or, I am ready. (Also indicates that a new station is ready to operate, e.g., the first transmission after setting up a DXpedition station.)
- QRX – When will you call me again? Or, I will call you again at \_\_\_\_\_. (Standby.)
- QRZ – Who is calling me? Or, you are being called by \_\_\_\_\_.
- QSB – Are my signals fading? Or, your signals are fading.
- QSK – Can you hear me between your signals? Or, I can hear you between my signals. (A method of CW operation)
- QSL – Can you acknowledge receipt? Or, I am acknowledging receipt. (Also stands for: understood or copied)
- QSO – Can you communicate direct with me? Or, I can communicate with you direct. (A conversation)
- QST – General call preceding a message addressed to all amateurs and ARRL members.
- QSX – Will you listen to me on \_\_\_\_\_ kHz? Or, I am listening to you on \_\_\_\_\_ kHz. (Refers to a “split mode” frequency)
- QSY – Shall I move to a different frequency? Or, please change your frequency.
- QTH – What is your location? Or, my location is \_\_\_\_\_.

The RST<sup>79</sup> (Q) code below is the last of the brevity codes:

#### Readability

- 1 – Unreadable.
- 2 – Barely readable.
- 3 – Readable with lots of difficulty.
- 4 – Readable with barely any difficulty.
- 5 – Perfectly readable.

### Signal Strength

- 1 – Faint signals, barely able to copy.
- 2 – Very weak signal.
- 3 – Weak signal.
- 4 – Fair signal.
- 5 – Fairly good signal.
- 6 – Good signal.
- 7 – Moderately strong signal.
- 8 – Strong signal.
- 9 – Extremely strong signal.

### Tone

- 1 – Very rough and broad.
- 2 – Very harsh and broad.
- 3 – Rough tone.
- 4 – Rough note.
- 5 – Strong ripple.
- 6 – Trace of ripple.
- 7 – Near pure tone.
- 8 – Near perfect tone.
- 9 – Perfect tone.

## Chapter 13

# Before Pressing that PTT

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At this point, I hope you are chomping at the bit to either get back on the air or to get your license. I am going to guess you have a working radio and antenna, and maybe you have been doing some listening. Likewise, I have the expectation you hold a valid General Class license or above. Maybe you are not necessarily proficient but still able to pound some brass, copy a few Q-Signals and rattle off some phonetics. You might be that radio amateur who has done his share of operating in the past, but has not been on the air for the last thirty or forty years. Your station might fall into the vintage class or maybe you decided this is a sure thing and purchased a shiny new rig. Excellent! You are going to be surprised of how alive and vibrant this remarkable hobby is. If you are a new licensee, WELCOME!

The following is a checklist for you to use prior to pressing the PTT or foot switch:

1. The first thing you want to do is obtain a copy of the current band plan. It is a chart showing what frequencies and modes are usable with the license you possess. The ARRL offers nice printable charts at <http://www.arrl.org/graphical-frequency-allocations>. Years ago, this type of list was a chart titled *The Amateur Bands*, and was found in the first chapter of *ARRL handbooks*. Take notice to the current band plan in that there are four additional HF bands available, i.e., 60m, 30m, 17m, and 12m compared to when you likely operated last. Please refer to Chapter 3 for more information.

2. You should know where you can legally operate after reviewing the band plan. I'm going to guess you would start out attempting to make some phone contacts before using CW. The rule of thumb is to use *LSB*<sup>80</sup> (lower-sideband) when operating 40, 75, and 160-meters. When operating on 60, 20, 17, 15, 12, 10 and 6-meters, you should use USB. Although the VHF and UHF bands are well known for using FM and repeaters, there are people that use USB in the allotted portion of those bands. If you resurrected an AM station, you will find yourself welcomed down on 75 and 160-meters by other AM-ers. You need to look for them though. I expect you know it is not cool to call a SSB station using AM. You should also be aware that 30 meters is reserved for CW and digital modes only. Please refer to Chapter 7 regarding the digital modes.
3. Let us cover a few nuances before flipping the switch. A couple of things changed while I was away from HF for forty plus years. One of the first is that we no longer need to log each-and-every transmission. This changed June 9, 1983.<sup>81</sup> In fact, you do not need to log any transmissions if you do not want to. The way we interface with each other on the air has changed a little bit too since the 1960's and 70's. Nothing outrageous, but worth noting before you call CQ. CQing has not changed at all, but when an OM or YL responds, they typically do not use your callsign first, followed by "this is" and their callsign. Instead, they only give their callsign (it is assumed they are calling you). At that point, you say their callsign followed by "this is" and your callsign. There is nothing wrong with doing it the proper way— it's just not as common.
4. In the past, if a W3 returned your call, we could count on him being in Pennsylvania, Delaware, Maryland, or DC. Not anymore. In 1978,<sup>82</sup> the FCC dropped the requirement of a licensee to change their call sign when moving into a



different call-area. It's now remarkably common to hear W1's, K9's and AA3's having a QTH in Florida. We now find 6's in 4's call area, 2's in 7's and so on. With the change, approximately 88%<sup>83</sup> of the callsigns you hear will reside in the correct numbered area.

5. If you plan to operate CW, which I hope you do, a signal report is no longer sent as 599 but rather 5NN. We spoke about "Cut Numbers" earlier. When sending your name, it is no longer, "Name is Lou" but rather "Name Lou" or "OP Lou." With the QTH, it is "QTH WI" or maybe "QTH Port Washington, WI." There is no "is" between QTH and your city or state. There is much more shorthand taking place than years ago. It is not necessarily a rule or procedure, but rather something that has evolved over time.
6. DXing is near and dear to me. By the amount I wrote on DXing, you probably figured that out. I covered this earlier but will remind you again. If you are planning to work DX, it is ultra important to etch the following into your brain: not all, but the majority of DX stations, especially if they are rare, operate in a split mode. For example, if you hear a DX station and become elated because you do not hear anyone calling him, STOP! Do not call him—at least not on that frequency. The reason you are not hearing others calling is because the DX-ers are calling him on a different frequency, i.e., the DX station is transmitting on one frequency and the callers are calling on a different one, hence the term split. On SSB, listen 5 to 10-KHz up and you will find the pileup of stations calling him. Depending on the rarity of the DX, the pileup could be anywhere from 5 to 15, even 20-KHz wide. It sounds like a zoo! On CW, it starts at least 1 if not 2-KHz up from where you hear the DX station and might get as wide as 5 to 10-KHz. Take time to *listen* to the DX. And then, LISTEN again! He should be saying "UP" after his call sign. The reason I said not to call the DX on the frequency you

heard him on is because the “pileup” is listening to that frequency, and they do not want you interfering. You might be in for a big surprise if you were to call him there. Please refer to Chapter 11, Beyond Lids.

7. Do not let the bad behavior get to you. As referenced in the Beyond Lids chapter, do not get into a confrontation with the QRM-ers. Do not fuel their fire. Move somewhere else and if worse comes to worse, turn your radio off and come back later. It is not worth letting a few simpletons get to us and spoil our fun. Eventually they will give up and go away.

By possessing a valid license, you are qualified to get back on the air and start making some contacts. Do not forget that you are the captain of your station and ultimately responsible for the correct and legal operation of it. Make sure you are aware of the rules and regulations applying to your license classification. Answers can be found on the ARRL website at <http://www.arrl.org/part-97-amateur-radio>.

If you do not have a license, now is the time to purchase that study guide, read it, and take the exam. Find a local club and ask for help. The members will be more than happy to assist.

Hope to work you soon!

73 and God bless...

Gary  
K9DJT

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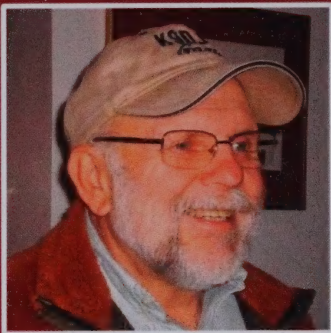




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Gary Drasch acquired his radio amateur Novice license in 1960 at age 12 and his General class license at 13. After graduating from high school, he attended the Milwaukee Area Technical College, and received a diploma in Electronics, Radio, and Television. He continued his education by earning a two-year certificate in Radio Communications. After graduation, he obtained an FCC commercial First Class Radiotelephone Operator License. It

was considered the pinnacle of licenses as it was required to operate and maintain TV/radio broadcast transmitters at the time.

His electronics career began as the owner and operator of a TV, audio, and communications sales and service business. He closed the business after eighteen years and spent a short stint in the radio pager business before joining the John Fluke Manufacturing Company in 1985 as a Sales Engineer. He retired 24 years later at the age of 62 and immediately returned to ham radio. He became totally reabsorbed into the hobby and attained his Extra class radio amateur license. DXing, contesting, antenna experimentation, and home-brewing accessories are his passion. Thus far, he has worked 304 countries (entities) and 1335 band slots. He earned the DX Century Club award using mixed, CW, phone, and digital modes. He captured the Worked All Continents award and the Work Antarctica Callsigns Award. He has Worked All States in all three modes and received the Triple Play award.

Memberships include the American Radio Relay League, The Society of Midwest Contesters, and The Greater Milwaukee DX Association. He is also a member and Past President of the Ozaukee Radio Club. Gary and his wife Chris have been married for 45 years and live in Port Washington, Wisconsin. They have two adult children, Jennifer and Andrew.



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